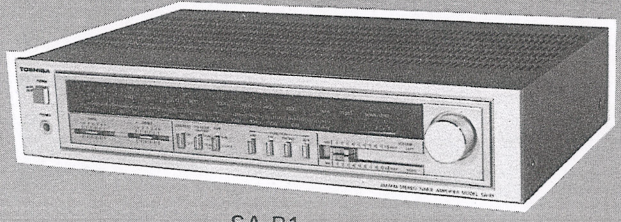
X G 447

**SERVICE DATA**
**FILE NO. 170-141**

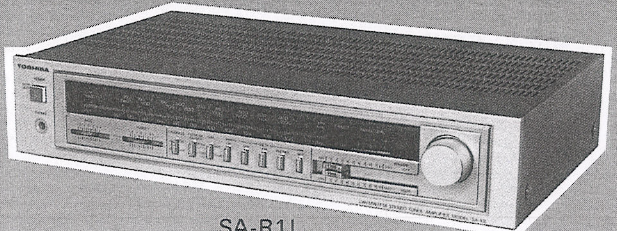
# TOSHIBA

## STEREO TUNER AMPLIFIER

# SA-R1, SA-R1L



SA-R1



SA-R1L

## SPECIFICATIONS

### ■ Amplifier Section

| | |
|---|---|
| **Power Output** | |
| **40 Hz ∿ 20 kHz both channels driven:** | 20W x 2 8 ohms<br>20W x 2 4 ohms |
| **1 kHz both channels driven:** | 22W x 2 8 ohms<br>25W x 2 4 ohms |
| **Total Harmonic Distortion: at rated power output:** | 0.09% (at 8 ohms) |
| **Intermodulation Distortion:** | 0.09% |
| **Damping Factor:** | 25 |
| **Input (Sensitivity/Impedance)** | |
| **PHONO:** | 2.5mV/47k ohms |
| **AUX:** | 150mV/47k ohms |
| **TAPE:** | 150mV/47k ohms |
| **PHONO Overload Level:** | 150mVrms at 1 kHz |
| **Output Level** | |
| **TAPE REC:** | 150mV |
| **Frequency Response** | |
| **PHONO (RIAA Equalization):** | 30 Hz to 20 kHz ±0.5 dB |
| **AUX, TAPE:** | 10 Hz to 40 kHz $\pm\frac{1}{2}$ dB |
| **Tone Controls:** | |
| **BASS:** | ±8 dB, (100 Hz) |
| **TREBLE:** | ±8 dB (10 kHz) |
| **Loudness Contour:** | +8 dB (100 Hz) |
| **Signal-to-Noise Ratio (IHF short-circuited A network, rated power)** | |
| **PHONO:** | 70 dB |
| **AUX, TAPE:** | 90 dB |

### ■ FM Tuner Section

| | |
|---|---|
| **Receiving Frequency** | 87.5 ∿ 108 MHz |
| **Usable Sensitivity:** | Mono 2.0 μV (300 ohms)<br>(S/N 26 dB, 40 kHz dev.) |
| **Signal-to-Noise Ratio: (40K dev.)** | Mono 68 dB, Stereo 60 dB |
| **Distortion 1 kHz:** | Mono 0.3%, Stereo 0.6% |
| **Frequency Response:** | 30 Hz to 15 kHz $\pm^{0.5}_{2}$ dB |
| **Capture Ratio:** | 1.5 dB |
| **Alternate Channel Selectivity:** | 60 dB (±300 kHz) |
| **Spurious Response Ratio:** | 75 dB |
| **Image Rejection Ratio:** | 60 dB |
| **IF Rejection Ratio:** | 75 dB |
| **AM Suppression Ratio:** | 50 dB |
| **Stereo Separation:** | 35 dB (1 kHz) |

### ■ AM Tuner Section

| | MW | LW |
|---|---|---|
| **Receiving Frequency** | 525∿1605KHz | 145 ∿ 360 KHz |
| **Sensitivity:** | 350 μV/m (ferrite antenna) | 800μV/m |
| **Selectivity:** | 35 dB | |
| **Signal-to-Noise Ratio:** | 50 dB | 45 dB |
| **Image Rejection Ratio:** | 40 dB | 35 dB |

### ■ General

| | |
|---|---|
| **Power Requirement:** | 120V ∿ 60 Hz for USA & Canada<br>220V ∿ 50 Hz for Europe<br>240V ∿ 50 Hz for United Kingdom & Australia |
| **Power Consumption:** | 180 watts |
| **Dimensions (W x H x D):** | 420 x 92 x 285 (mm) |
| **Weight:** | 4.5 kg |

Specifications are subject to change without notice.

SA-R1: TE, AY [TA, TC] SA-R1L: TE, TU

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## SPECIFICATIONS

**Power Output:**
Continuous Power Output is 20 watts per channel, min. RMS at 8 ohms from 40 to 20,000 Hertz with no more than 0.09% total harmonic distortion.

### ■ Amplifier Section

| | |
|---|---|
| **Power Output** | |
| **40 Hz ∿ 20 kHz both channels driven:** | 20W x 2 8 ohms |
| | 20W x 2 4 ohms |
| **1 kHz both channels driven:** | 22W x 2 8 ohms |
| | 25W x 2 4 ohms |
| **Total Harmonic Distortion:** | |
| **at rated power output:** | 0.09% (at 8 ohms) |
| **Intermodulation Distortion:** | 0.09% |
| **Damping Factor:** | 25 |
| **Input (Sensitivity/Impedance)** | |
| **PHONO:** | 2.5 mV/47k ohms |
| **AUX/VIDEO:** | 150 mV/47k ohms |
| **TAPE:** | 150 mV/47k ohms |
| **PHONO Overload Level:** | 150 mV rms at 1 kHz |
| **Output Level** | |
| **TAPE REC:** | 150 mV |
| **Frequency Response** | |
| **PHONO (RIAA Equalization):** | 30 Hz to 15 kHz ±0.5 dB |
| **AUX/VIDEO, TAPE:** | 10 Hz to 40 kHz $^{+1}_{-2}$ dB |
| **Tone Controls:** | |
| **BASS:** | ±8 dB (100 Hz) |
| **TREBLE:** | ±8 dB (10 kHz) |
| **Loudness Contour:** | +8 dB (100 Hz) |
| **Signal-to-Noise Ratio (IHF short-circuited A network, rated power)** | |
| **PHONO:** | 70 dB |
| **AUX/VIDEO, TAPE:** | 90 dB |

### ■ FM Tuner Section

| | |
|---|---|
| **Usable Sensitivity:** | Mono 2.5 µV 13.2 dBf |
| **50 dB Quieting Sensitivity:** | Mono 5.4 µV 19.2 dBf<br>Stereo 65 µV 41.2 dBf |
| **Signal-to-Noise Ratio: (40K dev.)** | Mono 70 dB, Stereo 60 dB |
| **Distortion** | |
| **1 kHz:** | Mono 0.3%, Stereo 0.6% |
| **Frequency Response:** | 30 Hz to 15 kHz $^{+0.5}_{-2}$ dB |
| **Capture Ratio:** | 1.5 dB |
| **Alternate Channel Selectivity:** | 65 dB (±400 kHz) |
| **Spurious Response Ratio:** | 75 dB |
| **Image Rejection Ratio:** | 60 dB at 98 MHz |
| **IF Rejection Ratio:** | 60 dB at 98 MHz |
| **AM Suppression Ratio:** | 50 dB |
| **Stereo Separation:** | 35 dB (1 kHz) |

### ■ AM Tuner Section

| | |
|---|---|
| **Sensitivity:** | 350 µV/m<br>(IHF ferrite antenna) |
| **Selectivity:** | 35 dB |
| **Signal-to-Noise Ratio:** | 45 dB |
| **Image Rejection Ratio:** | 40 dB |

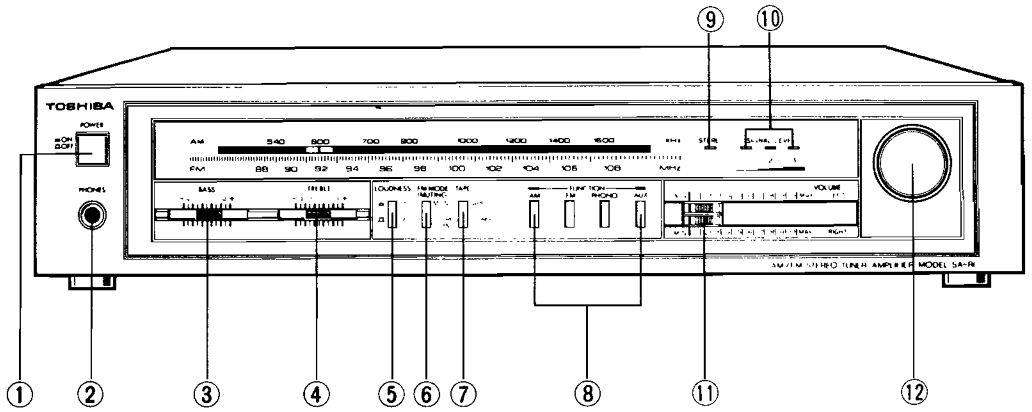
### ■ General

| | |
|---|---|
| **Power Requirement:** | 120 ∿ 60 Hz |
| **Power Consumption:** | 110 watts |
| **Dimensions (W x H x D):** | 420 x 92 x 285 (mm) |
| **Weight:** | 4.5 kg |

Specifications are subject to change without notice.

TA, TC

# 1. OPERATING INSTRUCTIONS



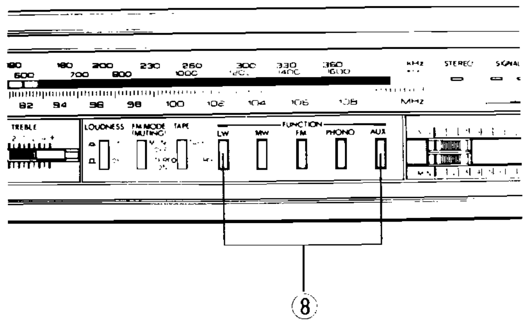


Figure 1

① **Power Switch**
Depress this switch to turn the power on and depress once more to turn the power off.

② **Phones**
Connect the headphone plug to this jack

③④ **Bass and Treble Controls**
Adjust for the desired bass and treble response. Leave both controls in the center 0 position for a flat response. Slide to the right to emphasize bass and/or treble and slide to the left to attenuate bass and/or treble.

⑤ **Loudness switch**
Turn this switch ON when listening at low volume levels to emphasize the low frequency.

⑥ **FM Mode Switch**
In the FM STEREO/MUTING ON position (■), the muting circuitry suppresses inter-station noise and both FM stereo and mono reception is possible. In the FM MONO/MUTING OFF position (▬), muting does not function and FM stereo broadcasts are heard in mono. Use this position to receive weak stations that the muting circuitry might suppress.

⑦ **Tape Mode Switch**
Use the SOURCE position to listen to radio broadcasts, records and the component connected to the AUX terminals. Use the TAPE position to listen to the tape deck.
- Do not change from the SOURCE position to the TAPE position while recording because this will interrupt the program source input signal.

⑧ **Function Switches**
Use these switches to select the desired program source:

| | |
|---|---|
| LW: | for LW radio broadcasts (SA-R1L) |
| MW: | for MW radio broadcasts (SA-R1L) |
| AM: | for AM radio broadcasts (SA-R1) |
| FM: | for FM radio broadcasts (SA-R1/SA-R1L) |
| PHONO: | for the turntable (SA-R1/SA-R1L) |
| AUX: | for the component connected to the AUX terminals (SA-R1/SA-R1L) |

⑨ **FM Stereo Indicator**
This lights up when an FM stereo broadcast is being received.

⑩ **Signal Strength Indicator**
These LEDs light to indicate the strength of the signal being received. The stronger the signal, the more LEDs light up.

⑪ **Volume Control**
Use this control to adjust the volume level. The left and right controls are separated to allow adjustment of the balance as well.

⑫ **Tuning Knob**

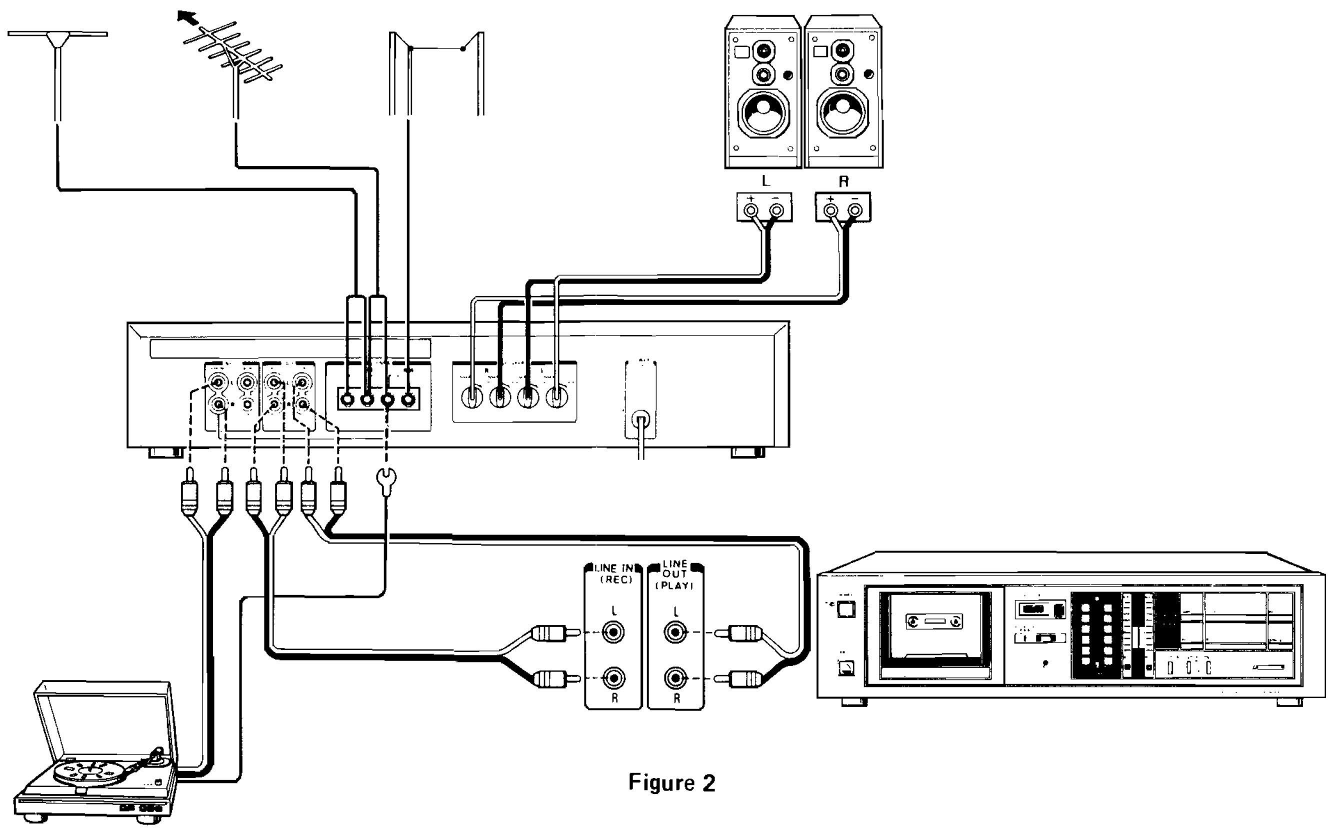


Figure 2

# 2. OPERATION

■ **Confirm that the front panel controls are in the following positions before the power is turned on:**
1. Volume control all the way to the left (minimum).
2. Tape Mode switch in the SOURCE position.
3. Tone controls (BASS, TREBLE) in centre zero position.

■ **Listening to a radio broadcast**
1. Press the Function switch ⑧ of the radio band you want to hear.
2. Use the Tuning knob ⑫ to tune in the desired station. The optimum reception point is where the most Signal Strength indicators ⑩ are lit. The FM Stereo indicator ⑨ will light if an FM stereo broadcast is being received. The tuning pointer will change from orange to green when a radio broadcast is reached.

**Notes:**

| | |
|---|---|
| For FM: | If the desired FM station is too far away for stereo reception, depress the FM Mode Switch to the FM MONO/MUTING OFF position (▬). |
| For LW, MW, AM: | An outdoor antenna should be set up if reception is not satisfactory with the built-in antenna. |

■ **Listening to records**
1. Depress the PHONO function switch.
2. Begin record playback and adjust the volume and tone controls as desired.

■ **Listening to tapes**
1. Set the Tape Mode switch to the TAPE position.
2. Put the tape deck in the playback mode and adjust the volume and tone controls as desired.

■ **Listening to components connected to the AUX terminals**
1. Depress the AUX function switch.
2. Put the component in the playback mode and adjust the volume and tone controls as desired.

■ **Recording**
1. Set the Tape Mode switch to the SOURCE position.
2. Depress the Function switch of the desired program source.
3. Start playback of the program to be recorded.
4. Start the tape deck recording mode and check that the proper recording level has been set.

■ **Tape Monitoring**
When recording with a tape deck connected to the TAPE terminals, the just-recorded signal can be monitored by switching the Tape Mode switch from the SOURCE position to the TAPE position if the tape deck is equipped with three heads.

# 3. DISASSEMBLY INSTRUCTIONS

### TOP COVER REMOVAL

1. Remove five screws Ⓐ, Ⓑ and Ⓒ can be removed from the unit. (See Figure 3, 4 and 5).

### FRONT PANEL REMOVAL

1. Remove the top cover. (See Figure 3, 4 and 5).
2. Remove one Tuning Knob Ⓓ. (See Figure 6)
3. Remove five screws Ⓔ and Ⓕ, can be removed from the unit. (See Figure 6 and 7).

### BOTTOM PLATE REMOVAL

1. Remove twelve screws Ⓖ and Ⓗ can be removed from the unit. (See Figure 8 and 9)

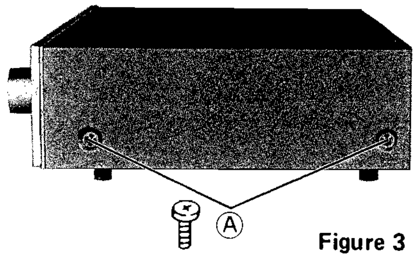


Figure 3

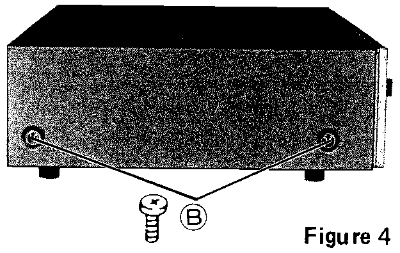


Figure 4

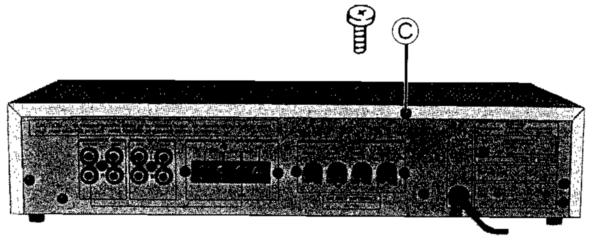


Figure 5

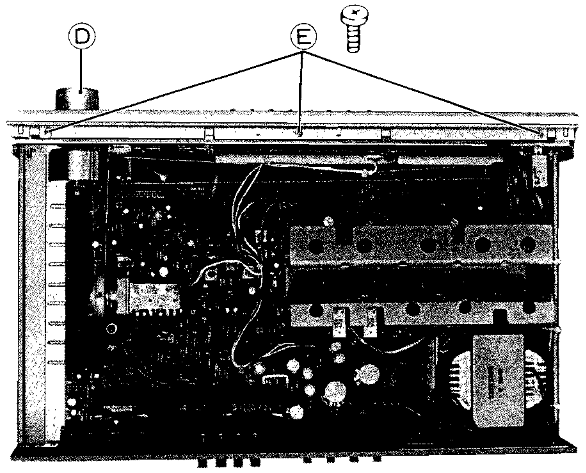


Figure 6

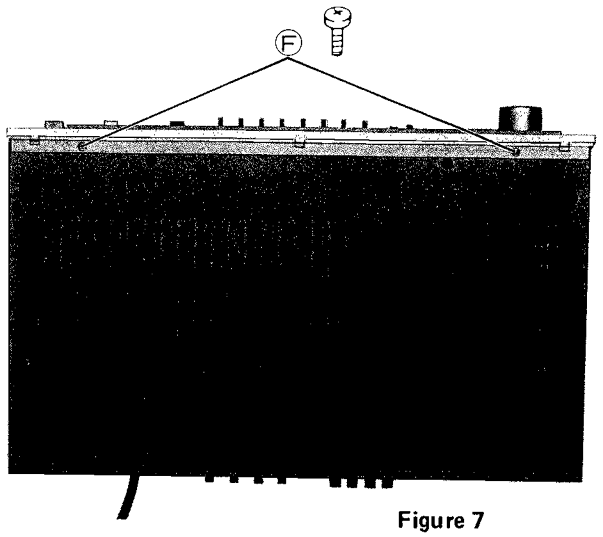


Figure 7

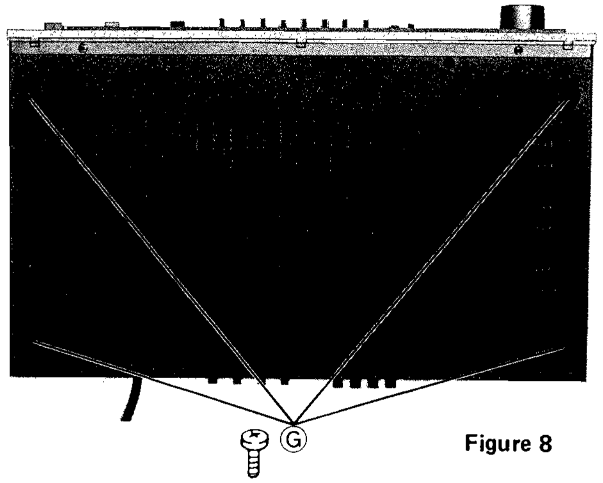


Figure 8

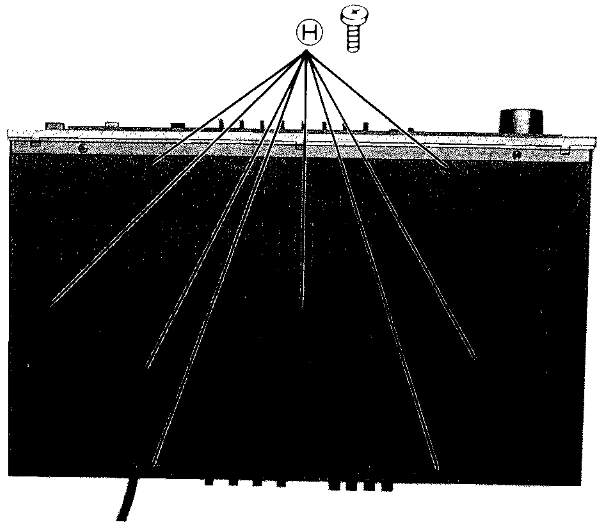
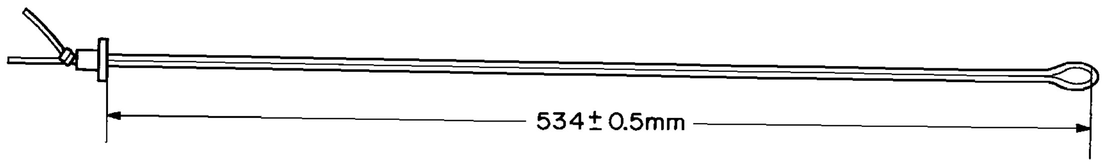


Figure 9

# 4. DIAL CORD RESTRINGING



Dial cord restringing

1. Turn the shaft of variable capacitor fully clockwise.
2. Wind the dial cord in the numerical stringing sequence indicated in the diagram.
3. After restringin the dial cord, turn the tuning shaft counter clockwise, then set the dial pointer pointer at marking point on the scale.

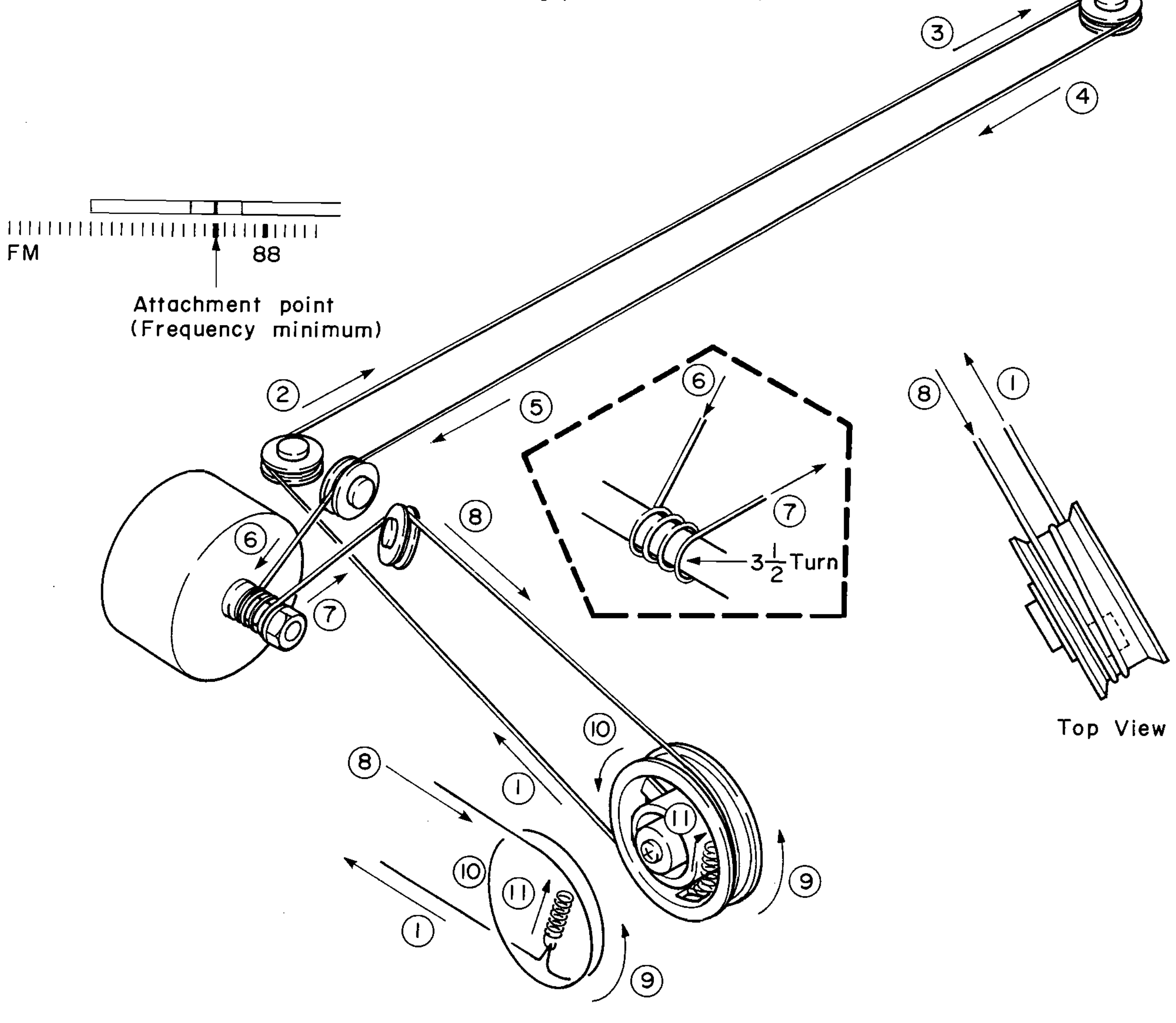

FM
88
Attachment point
(Frequency minimum)
③
④
②
⑤
⑥
⑦
⑧
①
3½Turn
⑥
⑦
⑧
⑧
①
Top View
⑩
①
⑪
⑩
⑪
①
⑨
⑨

Figure 10

# 5. ADJUSTMENTS

**SA-R1**

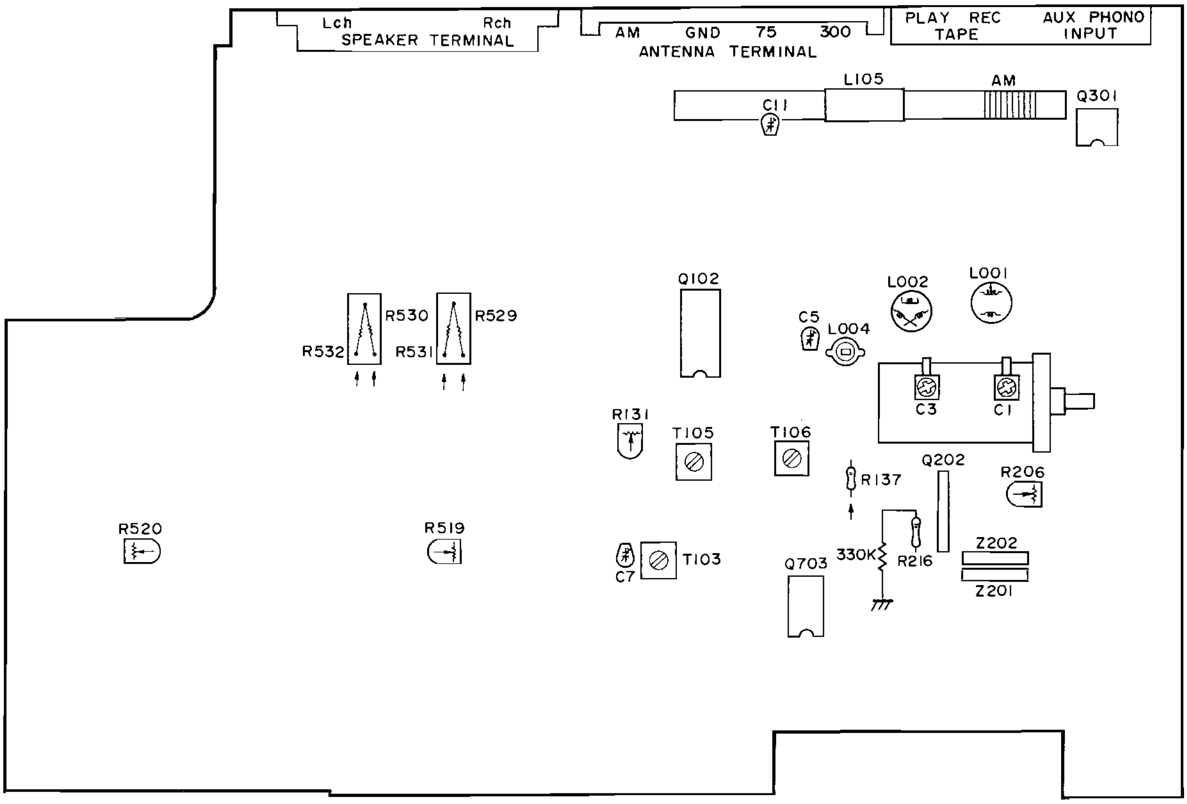

Lch
Rch
SPEAKER TERMINAL
AM
GND
75
300
ANTENNA TERMINAL
PLAY
REC
TAPE
AUX
PHONO
INPUT
L105
AM
C11
Q301
Q102
L002
L001
C5
L004
R530
R529
R532
R531
C3
C1
R131
T105
T106
Q202
R206
R137
R520
R519
Z202
T103
C7
Q703
330K
R216
Z201

Figure 11

**SA-R1L**

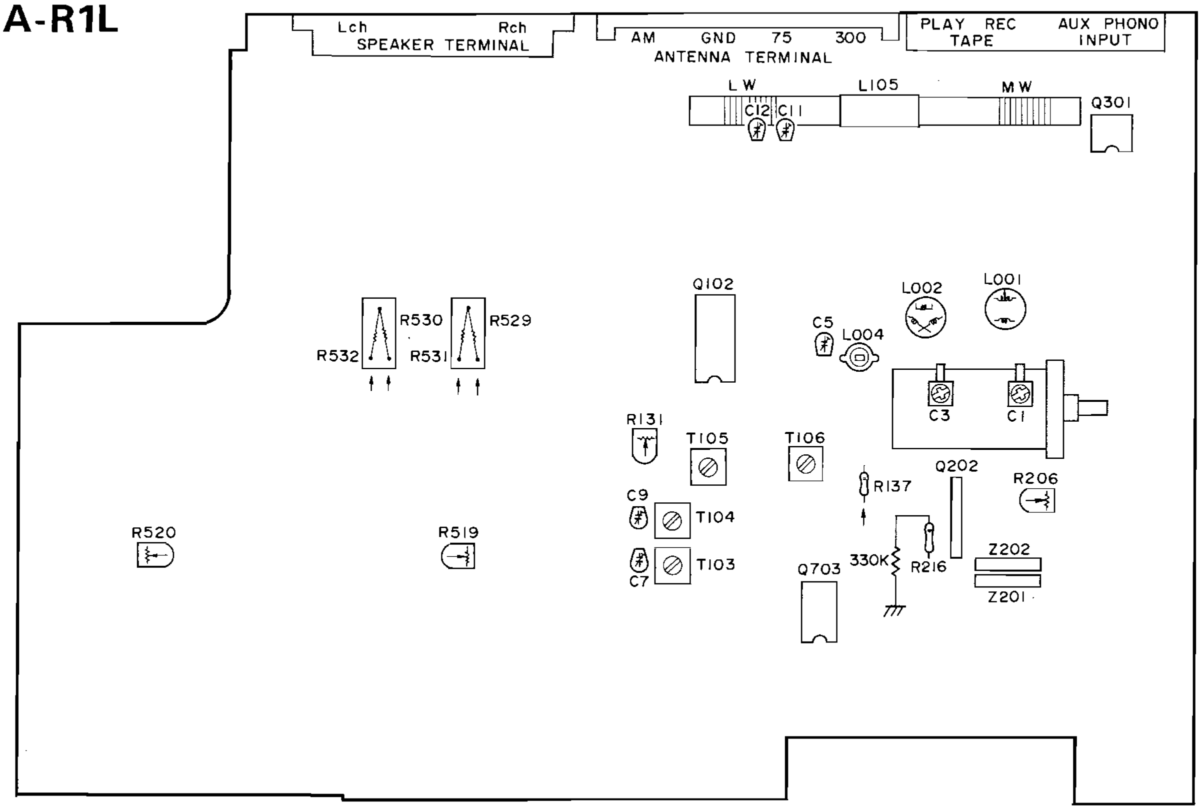

Lch
Rch
SPEAKER TERMINAL
AM
GND
75
300
ANTENNA TERMINAL
PLAY
REC
TAPE
AUX
PHONO
INPUT
LW
L105
MW
C12
C11
Q301
Q102
L002
L001
C5
L004
R530
R529
R532
R531
C3
C1
R131
T105
T106
Q202
R137
R206
C9
T104
R520
R519
Z202
T103
C7
Q703
330K
R216
Z201

Figure 12

## AM ADJUSTMENT

Test equipments/Tools required
1. Signal generator
2. Sweep generator
3. Test loop antenna
4. VTVM
5. Adjusting screwdriver
6. Adjusting bar
7. Oscilloscope

### IF ADJUSTMENT

| Step | Adjustment | Remarks |
|---|---|---|
| IF Response | T103 | Adjust for scope pattern with specified marker (460 kHz) as illustrated in Figure 13. |

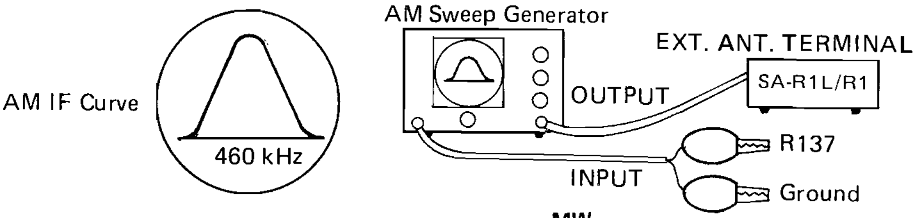


Figure 13

### FREQUENCY COVERAGE AND TRACKING ADJUSTMENT MW (LW)

| Step | Adjusting Circuit | Connection | | SG Frequency | Position of Tuning Dial | Adjustment | VTVM |
|---|---|---|---|---|---|---|---|
| | | Input | Output | | | | |
| 1 | OSC (Frequency Coverage) | Connect signal generator to test loop. | Connect VTVM to Speaker terminal A. | 515 KHz (142 KHz) 400 Hz 30% MOD. | Tune to 515 KHz (142 KHz) signal | T103 (T104) | Maximum |
| 2 | | | | 1650 KHz (365 KHz) 400 Hz 30% MOD. | Tune to 1650 KHz (365 KHz) signal | C7 (C9) | |
| Repeat steps 1 and 2. | | | | | | | |
| 3 | OSC (Frequency Coverage) | Connect signal generator to test loop. | Connect VTVM to Speaker terminal A. | 600 KHz (160 KHz) 400 Hz 30% MOD. | Tune to 600 KHz (160 KHz) signal | | Adjust for no scale error. |
| 4 | | | | 1400 KHz (360 KHz) 400 Hz 30% MOD. | Tune to 1400 KHz (360 KHz) signal | | |
| Repeat steps 3 and 4. If any error is present, repeat steps from 1 to 4. | | | | | | | |
| 5 | ANT (Tracking) | Connect signal generator to test loop. | Connect VTVM to Speaker terminal A. | 600 KHz (160 KHz) 400 Hz 30% MOD. | Tune to 600 KHz (160 KHz) signal | Ferrite Ant. Coil L105(MW) L105(LW) | Maximum |
| 6 | | | | 1400 KHz (360 KHz) 400 Hz 30% MOD. | Tune to 1400 KHz (360 KHz) signal | C11 (C12) | |
| Repeat step 5 and 6. | | | | | | | |

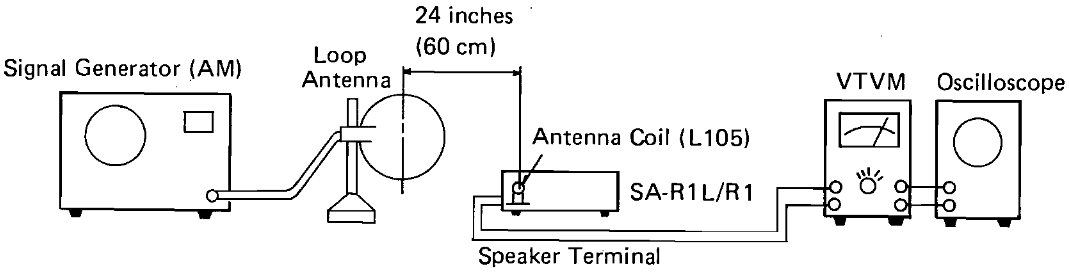

24 inches
(60 cm)
Signal Generator (AM)
Loop Antenna
VTVM
Oscilloscope
Antenna Coil (L105)
SA-R1L/R1
Speaker Terminal

Figure 14

### FM ADJUSTMENT

Test equipments/Tools required
1. Distortion meter
2. Signal generator
3. Oscilloscope
4. VTVM
5. FM dummy antenna (300 ohms)
6. Dummy load resistor
7. Adjusting screwdriver
8. Adjusting bar

| Step | Adjusting Circuit | Connection | | SG Frequency | Position of Tuning Dial | Adjustment | VTVM |
|---|---|---|---|---|---|---|---|
| | | Input | Output | | | | |
| 1 | OSC (Frequency coverage) | Connect FM signal generator to FM antenna terminal. | Connect VTVM to speaker terminal. | 87.5 MHz | Tune to 87.5 MHz signal | L004 | Maximum |
| 2 | | | | 108 MHz | Tune to 108.0 MHz signal | C5 | |
| Repeat steps 1 and 2. | | | | | | | |
| 3 | RF (Tracking) | Connect FM signal generator to FM antenna terminal. | Connect VTVM to speaker terminal. | 88 MHz | Tune to 88 MHz signal | L001<br>L002 | Maximum |
| 4 | | | | 108 MHz | Tune to 108 MHz signal | C02, C04<br>VR Trim. | |
| Repeat steps 3 and 4. | | | | | | | |

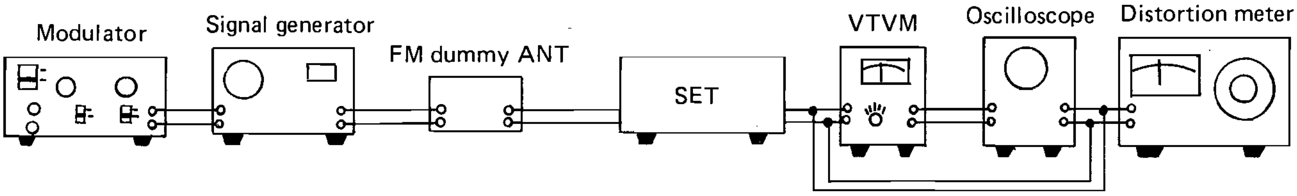

Modulator
Signal generator
FM dummy ANT
SET
VTVM
Oscilloscope
Distortion meter

Figure 15

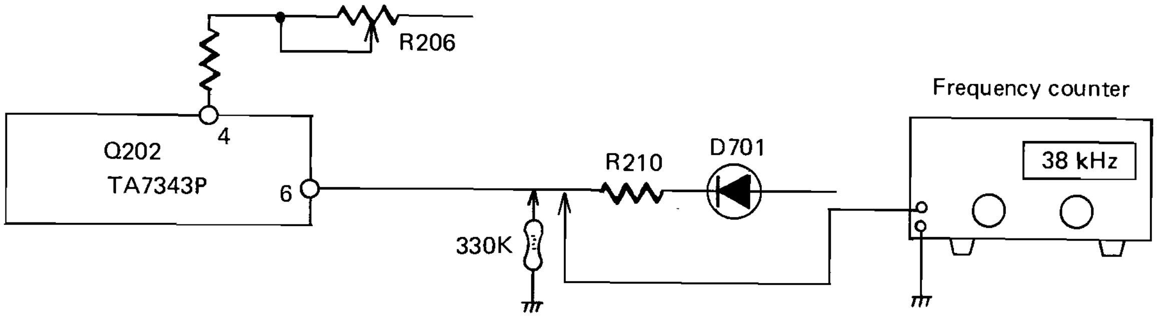
**CAUTION:**
When realigning the FM Receiving Frequency, the highest end of the frequency range should not be more than 108 MHz and the lowest end of the frequency range should not be less than 87.5 MHz, in order to comply with FTZ regulations in West Germany.

## FM MPX ADJUSTMENT

Test Equipments/Tools required

1. Frequency counter
2. Resistor 330K ohm

| | |
|---|---|
| Pilot signal adjustment | Connect a frequency counter to the R210 with 330K ohm Resistor, and adjust the R206 for 38 kHz reading counter with no-signal input. |


R206
Frequency counter
Q202
TA7343P
4
6
R210
D701
38 kHz
330K

## SIGNAL METER ADJUSTMENT (FM)

| Connection | Signal Generator | Adjustment |
|---|---|---|
| Connect signal generator to FM antenna terminal.<br>See Figure 16. | Frequency 98 MHz<br>SG output: 60 dB | Adjust the R131 so that the signal meter indicates 3. |

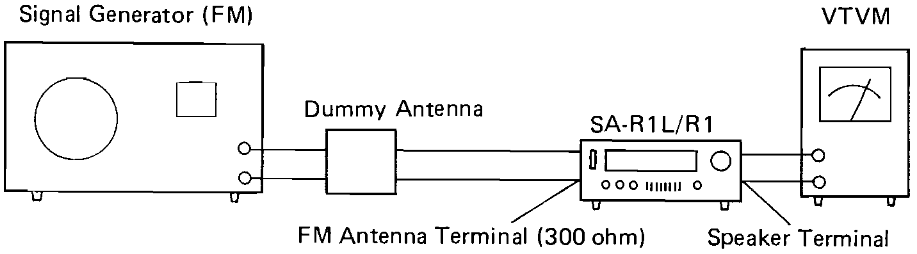
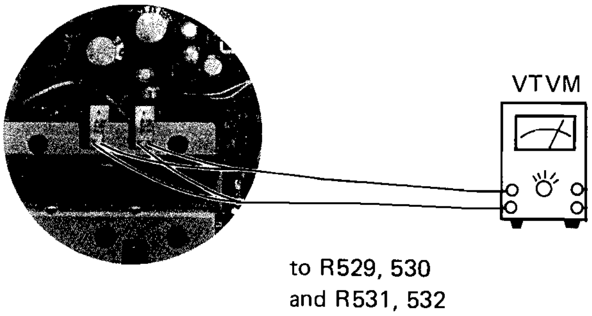

Signal Generator (FM)
VTVM
Dummy Antenna
SA-R1L/R1
FM Antenna Terminal (300 ohm)
Speaker Terminal

**Figure 16**

## IDLE ADJUSTMENT

Check emitter terminal of each transistor with resistors R529, R530, R531 or R532 and set to 3mV after six minutes from POWER-ON.


VTVM
to R529, 530
and R531, 532

# 6. BLOCK DIAGRAM

## SA-R1L

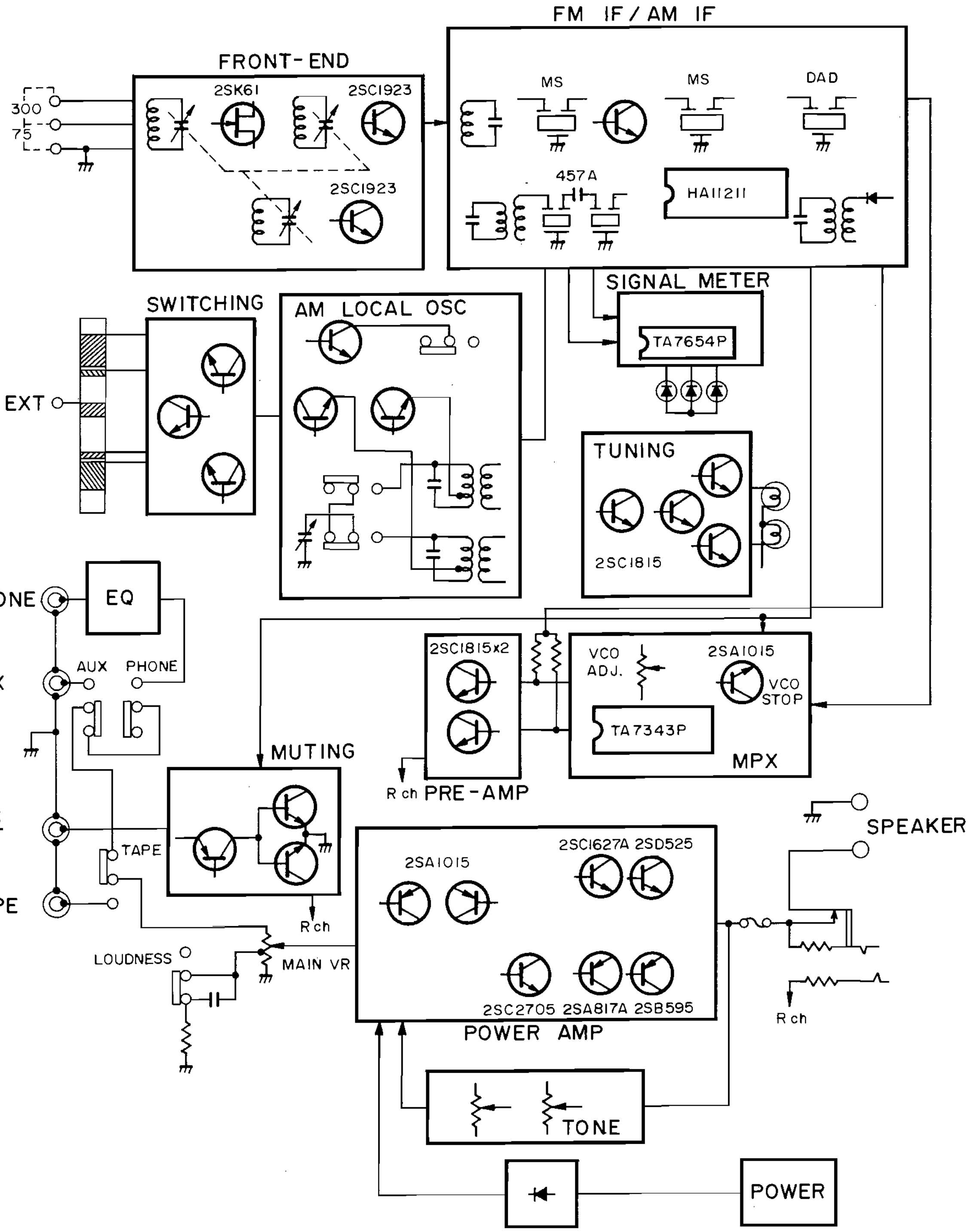

FM IF / AM IF
FRONT-END
300
75
2SK61
2SC1923
2SC1923
MS
MS
DAD
457A
HA11211
SIGNAL METER
TA7654P
SWITCHING
AM LOCAL OSC
AM EXT
TUNING
2SC1815
PHONE
EQ
AUX
AUX
PHONE
2SC1815x2
VCO ADJ.
2SA1015
VCO STOP
TA7343P
MPX
MUTING
R ch PRE-AMP
REC OUT
TAPE
TAPE
SPEAKER
2SA1015
2SC1627A 2SD525
R ch
LOUDNESS
MAIN VR
2SC2705 2SA817A 2SB595
POWER AMP
R ch
TONE
POWER

Figure 17.

## SA-R1

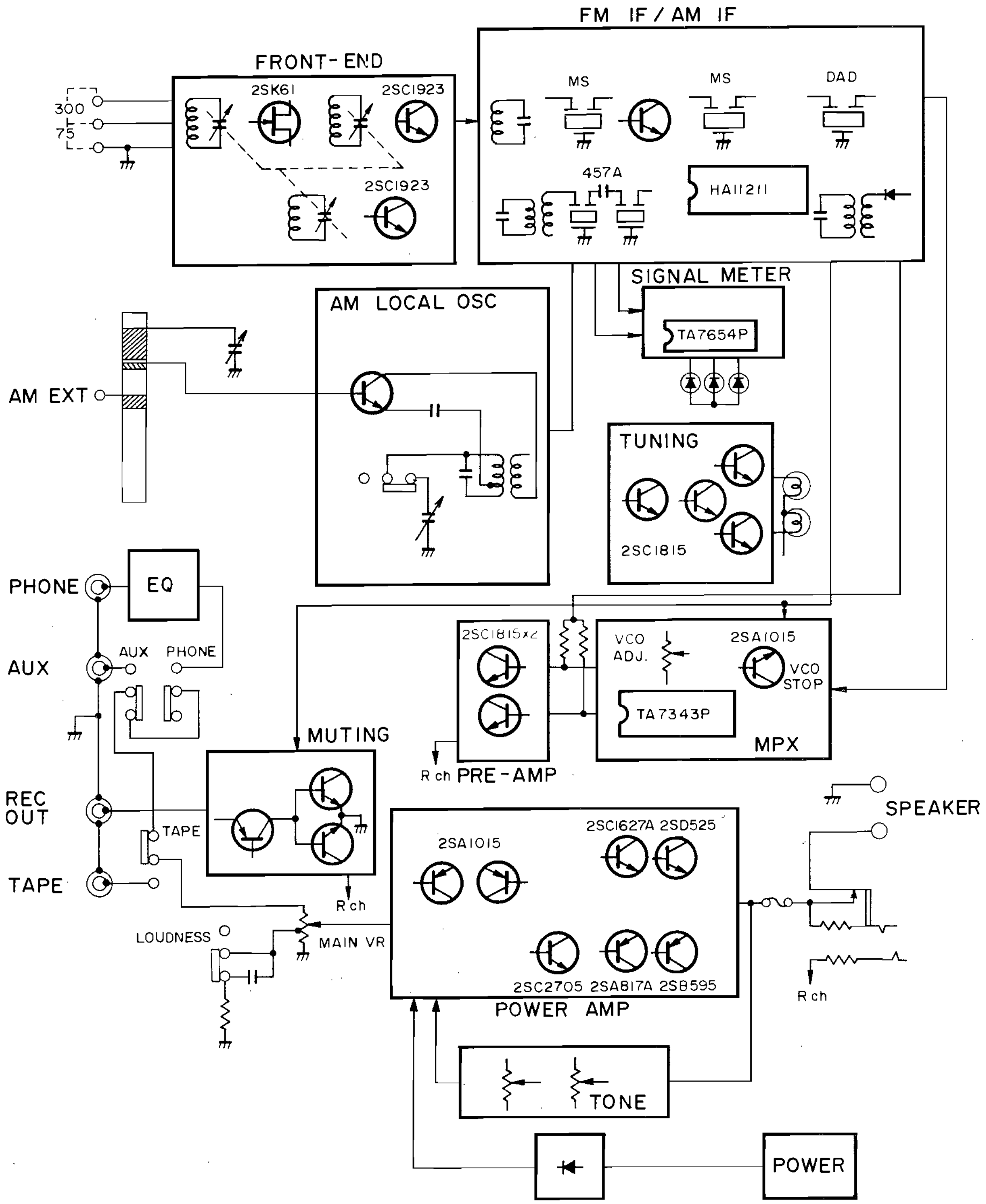
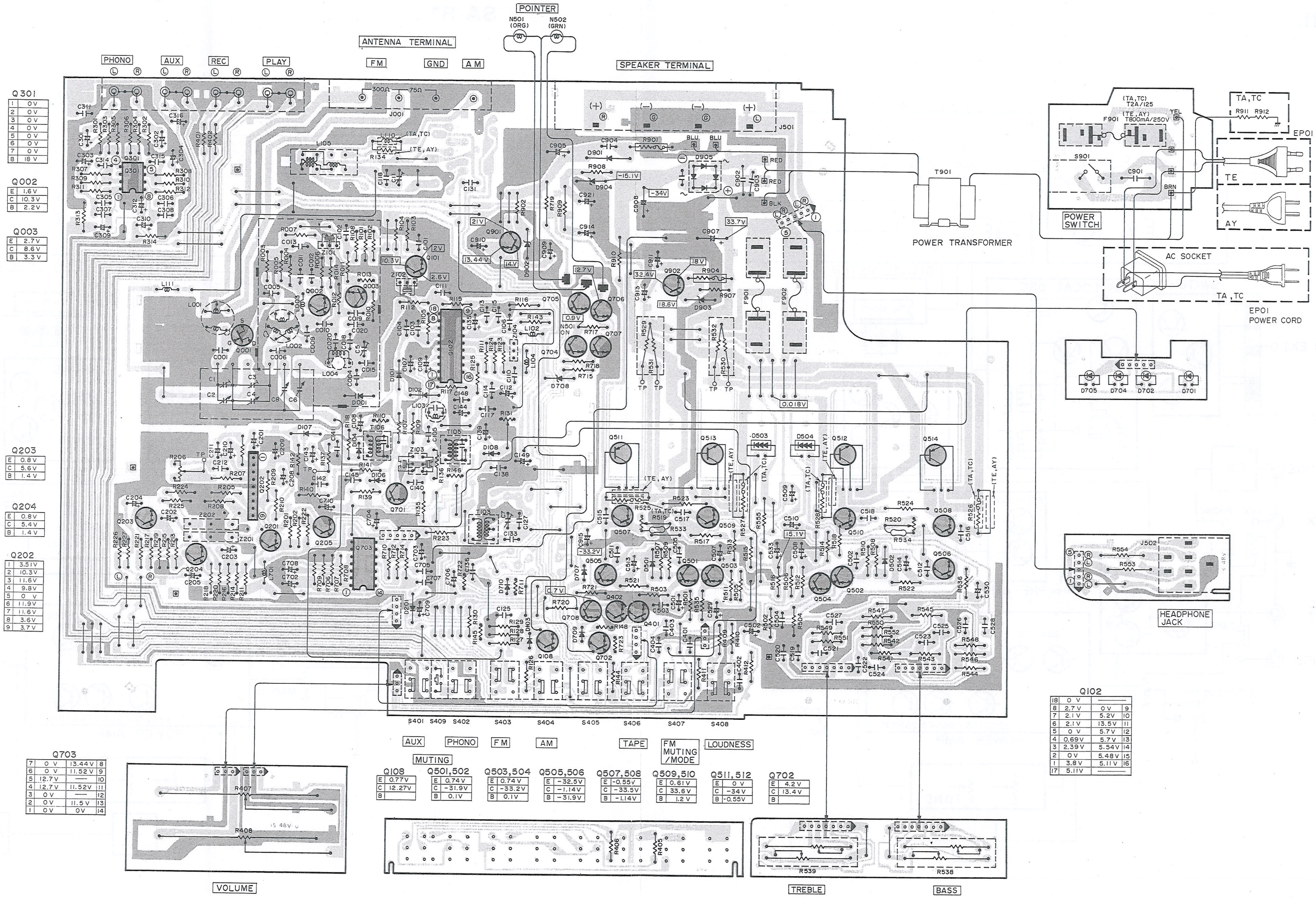

FM IF / AM IF
FRONT-END
300
75
2SK61
2SC1923
2SC1923
MS
MS
DAD
457A
HA11211
SIGNAL METER
TA7654P
AM LOCAL OSC
AM EXT
TUNING
2SC1815
PHONE
EQ
AUX
AUX
PHONE
2SC1815x2
VCO ADJ.
2SA1015
VCO STOP
TA7343P
MPX
MUTING
R ch PRE-AMP
REC OUT
TAPE
TAPE
SPEAKER
2SA1015
2SC1627A 2SD525
R ch
LOUDNESS
MAIN VR
2SC2705 2SA817A 2SB595
POWER AMP
R ch
TONE
POWER

Figure 18

# 7. ELECTRICAL PARTS LOCATIONS


POINTER
N501 (ORG)
N502 (GRN)
ANTENNA TERMINAL
FM
GND
AM
SPEAKER TERMINAL
PHONO
AUX
REC
PLAY
J001
J501
T901
POWER TRANSFORMER
POWER SWITCH
S901
F901
(TA,TC) T2A/125
(TE,AY) T800mA/250V
TA,TC
R911 R912
EP01
TE
AY
AC SOCKET
EP01 POWER CORD
D705 D704 D702 D701
J502
HEADPHONE JACK
S401 S409 S402 S403 S404 S405 S406 S407 S408
AUX
PHONO
FM
AM
TAPE
FM MUTING /MODE
LOUDNESS
MUTING
R407
R408
VOLUME
R406
R405
R539
TREBLE
R538
BASS

Q301

| | |
|---|---|
| 1 | 0 V |
| 2 | 0 V |
| 3 | 0 V |
| 4 | 0 V |
| 5 | 0 V |
| 6 | 0 V |
| 7 | 0 V |
| 8 | 18 V |

Q002

| | |
|---|---|
| E | 1.6 V |
| C | 10.3 V |
| B | 2.2 V |

Q003

| | |
|---|---|
| E | 2.7 V |
| C | 8.6 V |
| B | 3.3 V |

Q203

| | |
|---|---|
| E | 0.8 V |
| C | 5.6 V |
| B | 1.4 V |

Q204

| | |
|---|---|
| E | 0.8 V |
| C | 5.4 V |
| B | 1.4 V |

Q202

| | |
|---|---|
| 1 | 3.51 V |
| 2 | 10.3 V |
| 3 | 11.6 V |
| 4 | 9.8 V |
| 5 | 0 V |
| 6 | 11.9 V |
| 7 | 11.6 V |
| 8 | 3.6 V |
| 9 | 3.7 V |

Q703

| | | | |
|---|---|---|---|
| 7 | 0 V | 13.44 V | 8 |
| 6 | 0 V | 11.52 V | 9 |
| 5 | 12.7 V | — | 10 |
| 4 | 12.7 V | 11.52 V | 11 |
| 3 | 0 V | — | 12 |
| 2 | 0 V | 11.5 V | 13 |
| 1 | 0 V | 0 V | 14 |

Q108

| | |
|---|---|
| E | 0.77 V |
| C | 12.27 V |
| B | |

Q501,502

| | |
|---|---|
| E | 0.74 V |
| C | -31.9 V |
| B | 0.1 V |

Q503,504

| | |
|---|---|
| E | 0.74 V |
| C | -33.2 V |
| B | 0.1 V |

Q505,506

| | |
|---|---|
| E | -32.5 V |
| C | -1.14 V |
| B | -31.9 V |

Q507,508

| | |
|---|---|
| E | -0.55 V |
| C | -33.5 V |
| B | -1.14 V |

Q509,510

| | |
|---|---|
| E | 0.61 V |
| C | 33.6 V |
| B | 1.2 V |

Q511,512

| | |
|---|---|
| E | 0 V |
| C | -34 V |
| B | -0.55 V |

Q702

| | |
|---|---|
| E | 4.2 V |
| C | 13.4 V |
| B | |

Q102

| | | | |
|---|---|---|---|
| 18 | 0 V | — | |
| 8 | 2.7 V | 0 V | 9 |
| 7 | 2.1 V | 5.2 V | 10 |
| 6 | 2.1 V | 13.5 V | 11 |
| 5 | 0 V | 5.7 V | 12 |
| 4 | 0.69 V | 5.7 V | 13 |
| 3 | 2.39 V | 5.54 V | 14 |
| 2 | 0 V | 5.48 V | 15 |
| 1 | 3.8 V | 5.11 V | 16 |
| 17 | 5.11 V | — | |

Figure 19

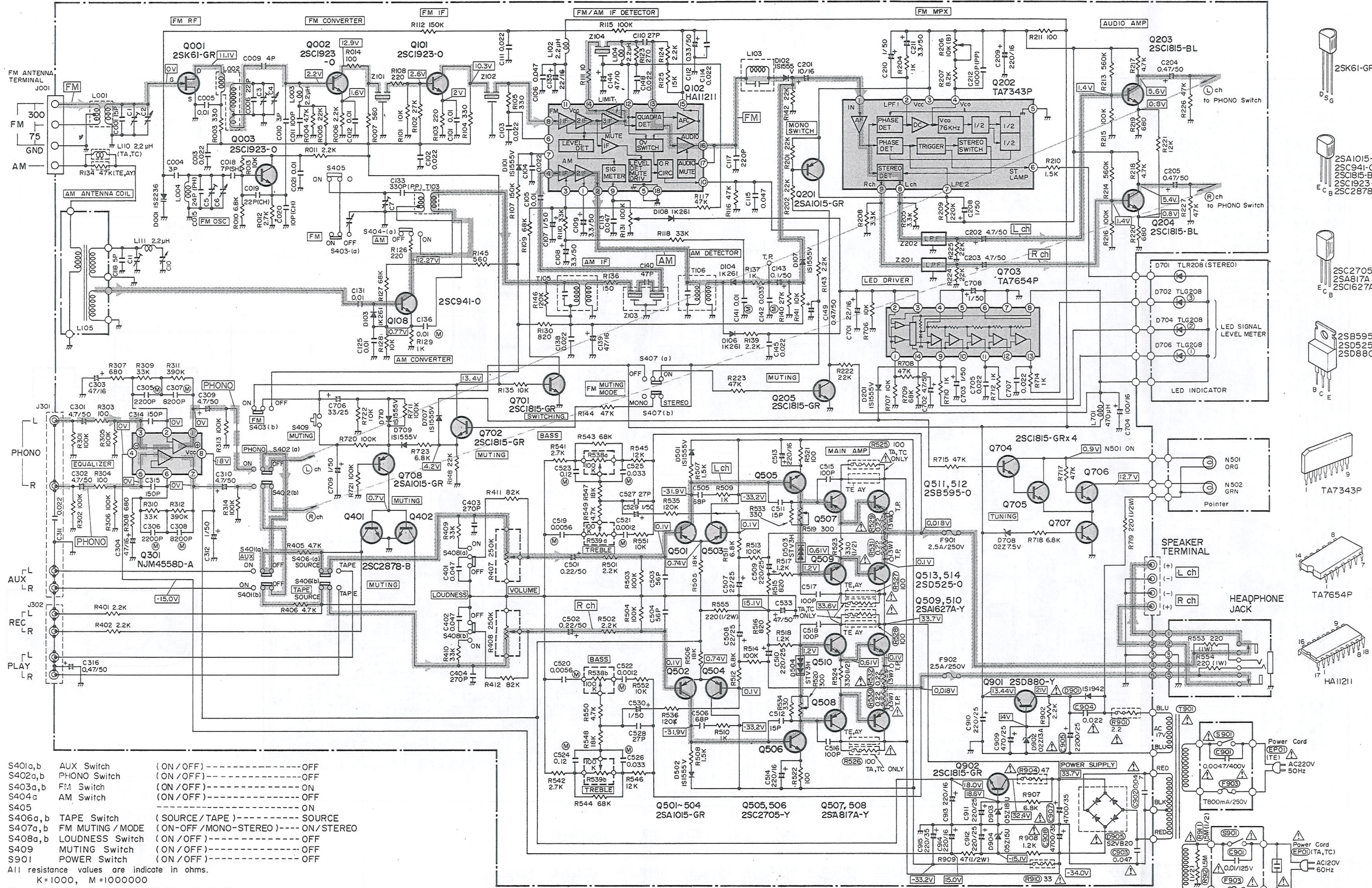
# 8. SCHEMATIC DIAGRAM

| Q003 | |
|---|---|
| E | 2.7V |
| C | 8.6V |
| B | 3.3V |

| Q102 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3.8V | 0V | 2.39V | 0.69V | 0V | 2.1V | 2.1V | 2.7V | 0V |
| 0V | 5.11V | 5.11V | 5.48V | 5.54V | 5.7V | 5.7V | 13.5V | 5.2V |
| 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |

| Q202 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3.51V | 10.3V | 11.6V | 9.8V | 0V | 11.9V | 11.6V | 3.6V | 3.7V |

| Q703 | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 0V | 0V | 0V | 1.27V | 1.27V | 0V | 0V |
| 0V | 11.52V | — | 11.52V | — | 11.52V | 13.44V |
| 14 | 13 | 12 | 11 | 10 | 9 | 8 |


FM RF
FM CONVERTER
FM IF
FM/AM IF DETECTOR
FM MPX
AUDIO AMP
FM ANTENNA TERMINAL J001
FM 300 75 GND AM
AM ANTENNA COIL
FM OSC
AM CONVERTER
AM IF
AM DETECTOR
LED DRIVER
LED INDICATOR
LED SIGNAL LEVEL METER
Q001 2SK61-GR
Q002 2SC1923-O
Q003 2SC1923-O
Q101 2SC1923-O
Q102 HA11211
Q108 2SC941-O
Q201 2SA1015-GR
Q202 TA7343P
Q203 2SC1815-BL
Q204 2SC1815-BL
Q205 2SC1815-GR
Q703 TA7654P
Q701 2SC1815-GR
Q702 2SC1815-GR
Q708 2SA1015-GR
Q301 NJM4558D-A
Q401 Q402 2SC2878-B
PHONO
AUX
REC
PLAY
J301
J302
EQUALIZER
SWITCHING
MUTING
BASS
TREBLE
LOUDNESS
VOLUME
MAIN AMP
Q501~504 2SA1015-GR
Q505,506 2SC2705-Y
Q507,508 2SA817A-Y
Q511,512 2SB595-O
Q513,514 2SD525-O
Q509,510 2SA1627A-Y
Q704 Q705 Q706 Q707 2SC1815-GR×4
SPEAKER TERMINAL
HEADPHONE JACK
POWER SUPPLY
Q901 2SD880-Y
Q902 2SC1815-GR
Power Cord (TE) AC220V 50Hz
Power Cord (TA,TC) AC120V 60Hz
2SK61-GR
2SA1015-GR 2SC941-O 2SC1815-BL/GR 2SC1923-O 2SC2878A/B
2SC2705-Y 2SA817A 2SC1627A
2SB595-O 2SD525-O 2SD880-Y
TA7343P
TA7654P
HA11211

| Q505,506 | |
|---|---|
| E | -32.5V |
| C | -1.14V |
| B | -31.9V |

| Q507,508 | |
|---|---|
| E | -0.55V |
| C | -33.5V |
| B | -1.14V |

| Q511,512 | |
|---|---|
| E | -0.1V |
| C | -34V |
| B | 0.55V |

S401a,b AUX Switch (ON/OFF)----------------OFF
S402a,b PHONO Switch (ON/OFF)----------------OFF
S403a,b FM Switch (ON/OFF)----------------ON
S404a AM Switch (ON/OFF)----------------OFF
S405 -------------------------ON
S406a,b TAPE Switch (SOURCE/TAPE)----------SOURCE
S407a,b FM MUTING/MODE (ON-OFF/MONO-STEREO)----ON/STEREO
S408a,b LOUDNESS Switch (ON/OFF)----------------OFF
S409 MUTING Switch (ON/OFF)----------------OFF
S901 POWER Switch (ON/OFF)----------------OFF

All resistance values are indicate in ohms.
K=1000, M=1000000

All capacitance values are indicated in microfarads.
$P=\frac{1}{10^{12}}$

Electrolytic capacitor indicates ☐/☐
Working Voltage (V)
Capacitance (μF)

All resistors are carbon film 1/4W, ±5% unless.

Figure 20

**CAUTION:**
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

# 9. ELECTRICAL PARTS LOCATIONS

Q301

| | |
|---|---|
| 1 | 0 V |
| 2 | 0 V |
| 3 | 0 V |
| 4 | 0 V |
| 5 | 0 V |
| 6 | 0 V |
| 7 | 0 V |
| 8 | 18 V |

Q002

| | |
|---|---|
| E | 1.6 V |
| C | 10.3 V |
| B | 2.2 V |

Q003

| | |
|---|---|
| E | 2.7 V |
| C | 8.6 V |
| B | 3.3 V |

Q203

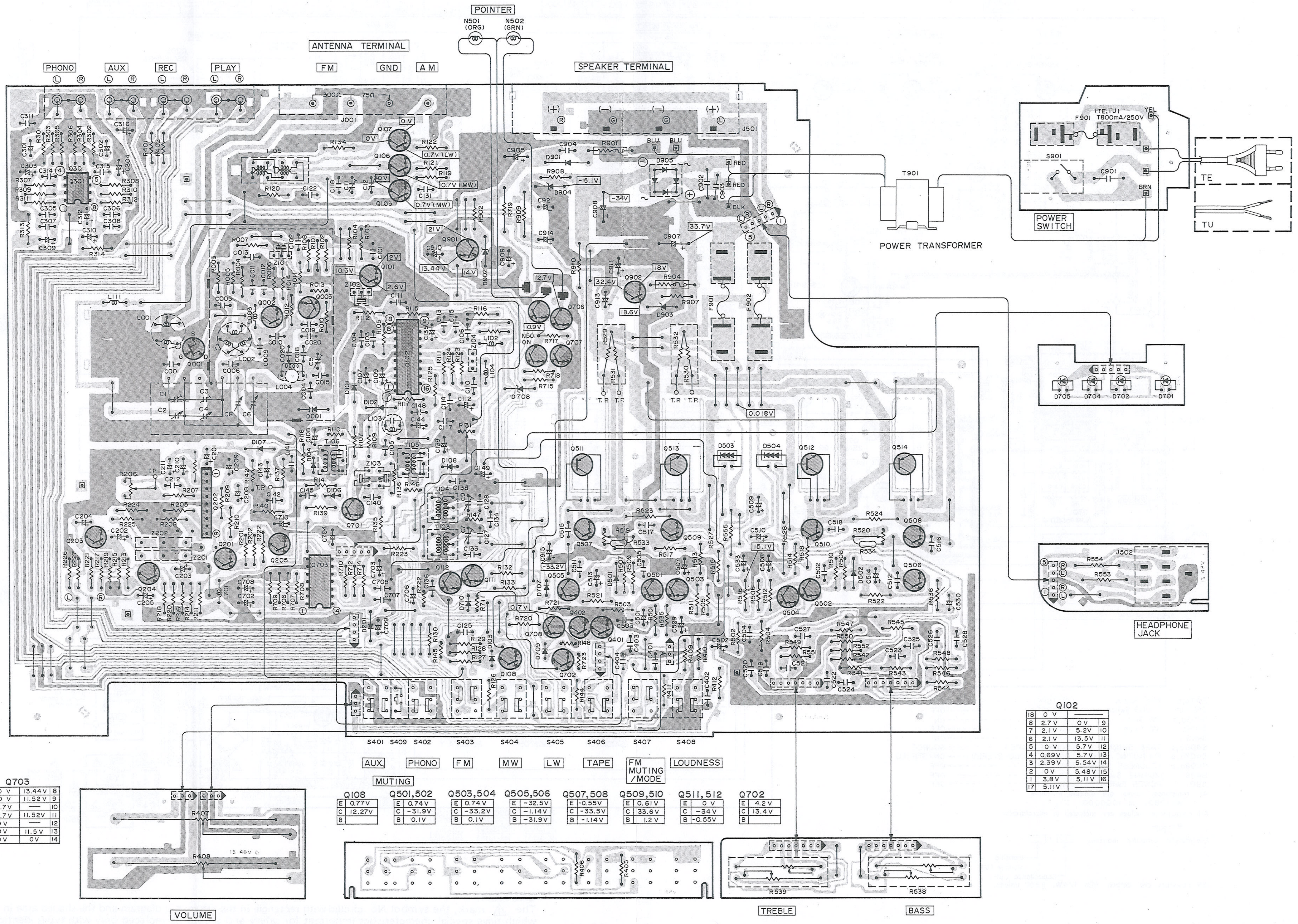
| | |
|---|---|
| E | 0.8 V |
| C | 5.6 V |
| B | 1.4 V |

Q204

| | |
|---|---|
| E | 0.8 V |
| C | 5.4 V |
| B | 1.4 V |

Q202

| | |
|---|---|
| 1 | 3.51 V |
| 2 | 10.3 V |
| 3 | 11.6 V |
| 4 | 9.8 V |
| 5 | 0 V |
| 6 | 11.9 V |
| 7 | 11.6 V |
| 8 | 3.6 V |
| 9 | 3.7 V |


POINTER
N501 (ORG)
N502 (GRN)
ANTENNA TERMINAL
FM
GND
AM
PHONO
AUX
REC
PLAY
Ⓛ Ⓡ
SPEAKER TERMINAL
300Ω
75Ω
J001
J501
(+) (−) (−) (+)
T901
POWER TRANSFORMER
F901 (TE,TU) T800mA/250V
YEL
S901
C901
BRN
TE
TU
POWER SWITCH
BLU
RED
BLK
D905
F901
F902
T.P
0.018V
33.7V
18V
32.4V
18.6V
-15.1V
-34V
0V
0.7V (LW)
0.7V (MW)
21V
13.44V
14V
12V
10.3V
2.6V
12.7V
0.9V
-33.2V
15.1V
0.7V
D705 D704 D702 D701
J502
R554
R553
HEADPHONE JACK
Q511 Q513 Q512 Q514
D503 D504
R407
R408
VOLUME
R406
R405
R539
R538
TREBLE
BASS
S401 S409 S402 S403 S404 S405 S406 S407 S408
AUX
PHONO
FM
MW
LW
TAPE
FM MUTING /MODE
LOUDNESS
MUTING

Q703

| | | | |
|---|---|---|---|
| 7 | 0 V | 13.44 V | 8 |
| 6 | 0 V | 11.52 V | 9 |
| 5 | 12.7 V | — | 10 |
| 4 | 12.7 V | 11.52 V | 11 |
| 3 | 0 V | — | 12 |
| 2 | 0 V | 11.5 V | 13 |
| 1 | 0 V | 0 V | 14 |

Q108

| | |
|---|---|
| E | 0.77 V |
| C | 12.27 V |
| B | |

Q501,502

| | |
|---|---|
| E | 0.74 V |
| C | -31.9 V |
| B | 0.1 V |

Q503,504

| | |
|---|---|
| E | 0.74 V |
| C | -33.2 V |
| B | 0.1 V |

Q505,506

| | |
|---|---|
| E | -32.5 V |
| C | -1.14 V |
| B | -31.9 V |

Q507,508

| | |
|---|---|
| E | -0.55 V |
| C | -33.5 V |
| B | -1.14 V |

Q509,510

| | |
|---|---|
| E | 0.61 V |
| C | 33.6 V |
| B | 1.2 V |

Q511,512

| | |
|---|---|
| E | 0 V |
| C | -34 V |
| B | -0.55 V |

Q702

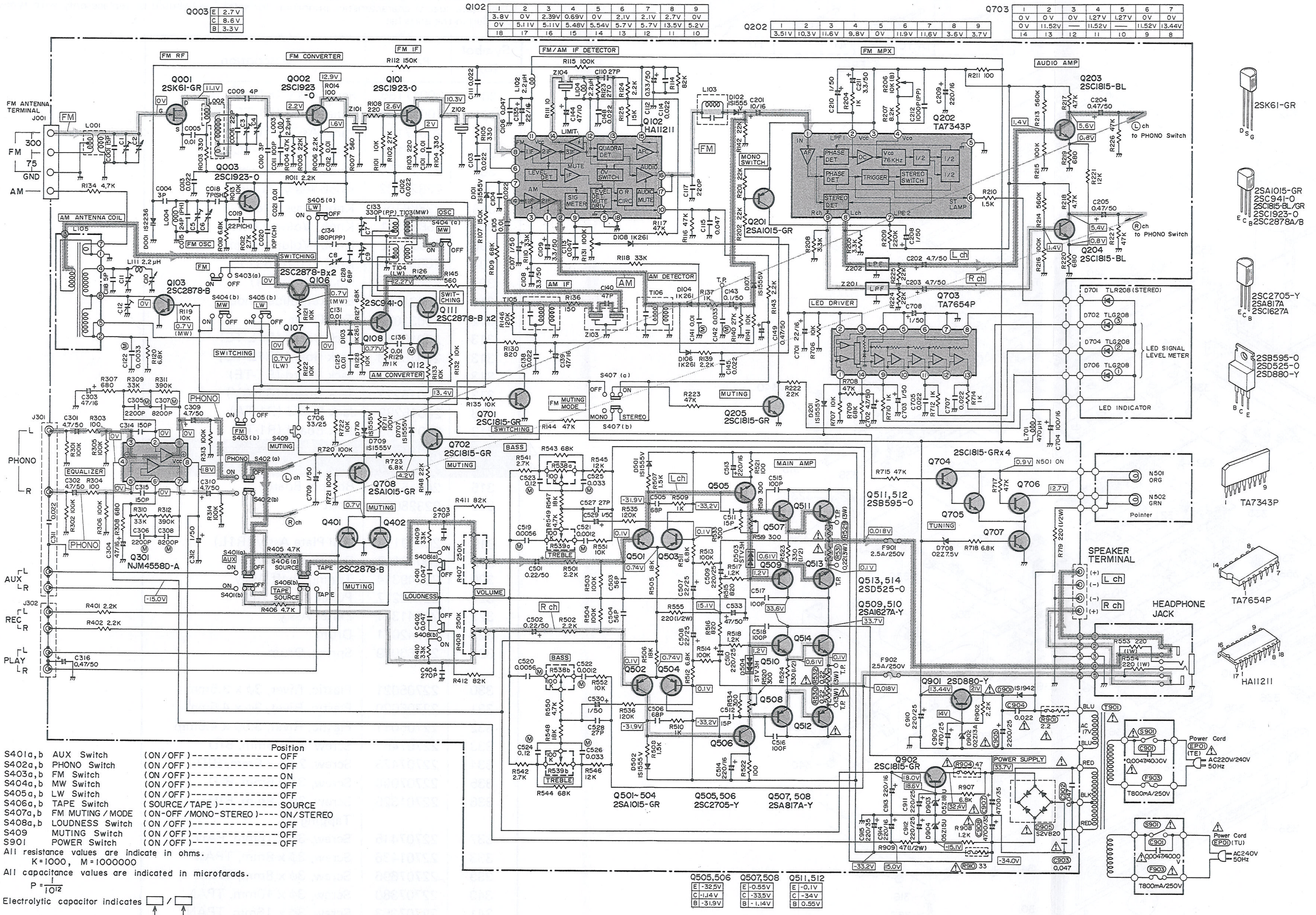
| | |
|---|---|
| E | 4.2 V |
| C | 13.4 V |
| B | |

Q102

| | | | |
|---|---|---|---|
| 18 | 0 V | — | |
| 8 | 2.7 V | 0 V | 9 |
| 7 | 2.1 V | 5.2 V | 10 |
| 6 | 2.1 V | 13.5 V | 11 |
| 5 | 0 V | 5.7 V | 12 |
| 4 | 0.69 V | 5.7 V | 13 |
| 3 | 2.39 V | 5.54 V | 14 |
| 2 | 0 V | 5.48 V | 15 |
| 1 | 3.8 V | 5.11 V | 16 |
| 17 | 5.11 V | — | |

Figure 21

# 10. SCHEMATIC DIAGRAM


FM RF
FM CONVERTER
FM IF
FM/AM IF DETECTOR
FM MPX
AUDIO AMP
AM ANTENNA COIL
FM OSC
SWITCHING
AM CONVERTER
OSC
AM IF
AM DETECTOR
LED DRIVER
MUTING
EQUALIZER
MAIN AMP
TUNING
LOUDNESS
VOLUME
BASS
TREBLE
POWER SUPPLY
LED SIGNAL LEVEL METER
LED INDICATOR
SPEAKER TERMINAL
HEADPHONE JACK
FM ANTENNA TERMINAL J001
PHONO
AUX
REC
PLAY
Q001 2SK61-GR
Q002 2SC1923-O
Q101 2SC1923-O
Q003 2SC1923-O
Q102 HA11211
Q202 TA7343P
Q703 TA7654P
Q203 2SC1815-BL
Q204 2SC1815-BL
Q201 2SA1015-GR
Q301 NJM4558D-A
Q701 2SC1815-GR
Q702 2SC1815-GR
Q708 2SA1015-GR
Q205 2SC1815-GR
Q401
Q402 2SC2878-B
2SC1815-GR×4
Q511,512 2SB595-O
Q513,514 2SD525-O
Q509,510 2SA1627A-Y
Q501~504 2SA1015-GR
Q505,506 2SC2705-Y
Q507,508 2SA817A-Y
Q901 2SD880-Y
Q902 2SC1815-GR
D701 TLR208 (STEREO)
D702 TLG208
D704 TLG208
D706 TLG208
N501 ORG
N502 GRN
Pointer
Power Cord
AC220V/240V 50Hz
AC240V 50Hz
T800mA/250V
2SK61-GR
2SA1015-GR
2SC941-O
2SC1815-BL/GR
2SC1923-O
2SC2878A/B
2SC2705-Y
2SA817A
2SC1627A
2SB595-O
2SD525-O
2SD880-Y
TA7343P
TA7654P
HA11211

Q003

| | |
|---|---|
| E | 2.7V |
| C | 8.6V |
| B | 3.3V |

Q102

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 3.8V | 0V | 2.39V | 0.69V | 0V | 2.1V | 2.1V | 2.7V | 0V |
| 0V | 5.11V | 5.11V | 5.48V | 5.54V | 5.7V | 5.7V | 13.5V | 5.2V |
| 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |

Q202

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| 3.51V | 10.3V | 11.6V | 9.8V | 0V | 11.9V | 11.6V | 3.6V | 3.7V |

Q703

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| 0V | 0V | 0V | 1.27V | 1.27V | 0V | 0V |
| 0V | 11.52V | — | 11.52V | — | 11.52V | 13.44V |
| 14 | 13 | 12 | 11 | 10 | 9 | 8 |

Q505,506

| | |
|---|---|
| E | -32.5V |
| C | -1.14V |
| B | -31.9V |

Q507,508

| | |
|---|---|
| E | -0.55V |
| C | -33.5V |
| B | -1.14V |

Q511,512

| | |
|---|---|
| E | -0.1V |
| C | -34V |
| B | 0.55V |

| | | | Position |
|---|---|---|---|
| S401a,b | AUX Switch | (ON/OFF) | OFF |
| S402a,b | PHONO Switch | (ON/OFF) | OFF |
| S403a,b | FM Switch | (ON/OFF) | ON |
| S404a,b | MW Switch | (ON/OFF) | OFF |
| S405a,b | LW Switch | (ON/OFF) | OFF |
| S406a,b | TAPE Switch | (SOURCE/TAPE) | SOURCE |
| S407a,b | FM MUTING/MODE | (ON-OFF/MONO-STEREO) | ON/STEREO |
| S408a,b | LOUDNESS Switch | (ON/OFF) | OFF |
| S409 | MUTING Switch | (ON/OFF) | OFF |
| S901 | POWER Switch | (ON/OFF) | OFF |

All resistance values are indicate in ohms.
K=1000, M=1000000

All capacitance values are indicated in microfarads.

$P=\frac{1}{10^{12}}$

Electrolytic capacitor indicates ☐ / ☐
Working Voltage (V)
Capacitance (µF)

All resistors are carbon film 1/4W, ±5 % unless.

Figure 22

**CAUTION:**
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replaced only with types identical to those in the original circuit or specified in the parts list.

## 11. EXPLODED VIEW CABINET

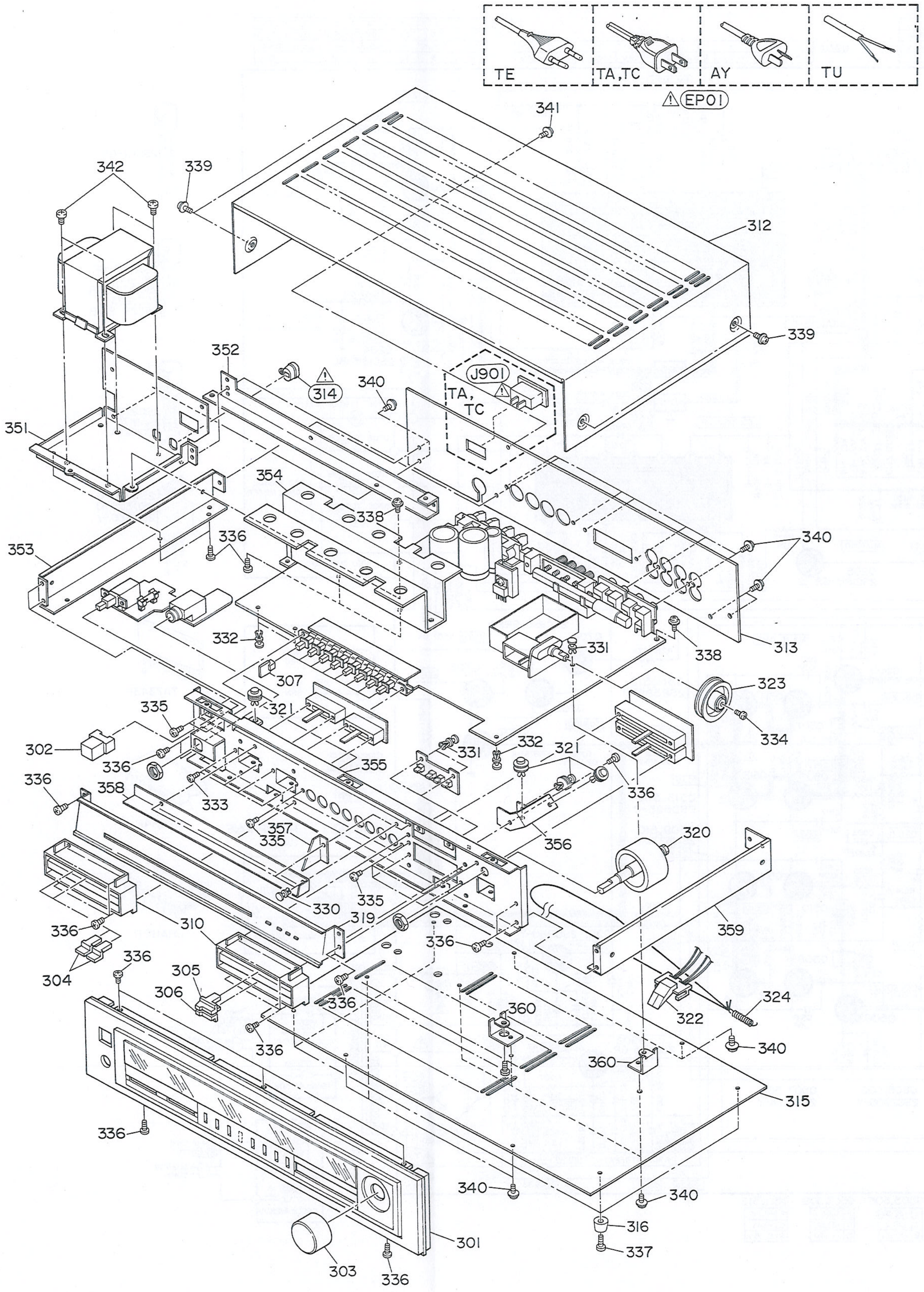

TE
TA,TC
AY
TU
EP01
341
342
339
312
339
352
314
340
J901
TA, TC
351
354
338
340
353
336
332
331
338
313
307
321
323
335
334
302
336
332
321
331
355
336
358
333
336
357
335
356
320
330
335
319
310
359
336
336
304
305
306
336
360
324
322
340
336
360
315
336
340
340
316
337
301
303
336

Figure 23

**NOTE:** Parts excluded in the Parts List are not available as replacement parts.

## 12. CABINET PARTS LIST

CAUTION:
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replace only with types identical to those in the original circuit or specified in the parts list.

| Symbol No. | Part No. | Description |
|---|---|---|
| 301 | 20017185 | Panel Ass'y (R1L-TE, TU) |
| 301 | 20017189 | Panel Ass'y (R1-TE, AY) |
| 301 | 20017194 | Panel Ass'y (R1-TA) |
| 301 | 20017195 | Panel Ass'y (R1-TC) |
| 302 | 22824381 | Knob Ass'y, Power |
| 303 | 22824382 | Knob Ass'y, Tuning |
| 304 | 22884154 | Knob, Bass, Treble |
| 305 | 25837661 | Knob, Volume Left |
| 306 | 25837662 | Knob, Volume Right |
| 307 | 25837665 | Knob, Push (R1L) |
| 307 | 25837665 | Knob, Push (R1) |
| 310 | 20031099 | Bracket, Slide Knob |
| 312 | 20031098 | Top Cover |
| 313 | 20015266 | Jack Board (R1L-TE) |
| 313 | 20015276 | Jack Board (R1L-TU) |
| 313 | 20015281 | Jack Board (R1-TE) |
| 313 | 20015277 | Jack Board (R1-AY) |
| 313 | 20015282 | Jack Board (R1-TA) |
| 313 | 20015283 | Jack Board (R1-TC) |
| ⚠ 314 | 25845528 | Cord Bush (TE, TU, AY) |
| ⚠ 314 | 25845120 | Cord Bush (TA, TC) |
| 315 | 20015267 | Bottom Board |
| 316 | 22828078 | Foot |
| 319 | 20019114 | Dial Plate Ass'y (R1L) |
| 319 | 20019117 | Dial Plate Ass'y (R1) |
| 320 | 22749314 | Tuning Shaft Ass'y |
| 321 | 22742217 | Pulley Ass'y, 14ϕ |
| 322 | 22741371 | Pinter Ass'y |
| 323 | 22742071 | Drum |
| 324 | 20866009 | Spring, Drum |
| 330 | 22705021 | Plastic, River, 3ϕ x 3.5mm |
| 331 | 22705020 | Plastic, Rivet, 3ϕ x 4.5mm |
| 332 | 22705031 | Plastic, Rivet, 3.5ϕ x 4.5mm |
| 333 | 22707451 | Screw, 2ϕ x 5mm, BID |
| 334 | 22707473 | Screw, 2.6ϕ x 6mm, BID |
| 335 | 22707066 | Screw, 3ϕ x 6mm, BID |
| 336 | 22701326 | Screw, 3ϕ x 8mm, BID Tapping |
| 337 | 22707415 | Screw, 3ϕ x 16mm, PAN |
| 338 | 22701436 | Screw, 3ϕ x 8mm, TPAN |
| 339 | 22707696 | Screw, 3ϕ x 8mm, TPAN |
| 340 | 22707380 | Screw, 3ϕ x 10mm, TPAN |
| 341 | 22707353 | Screw, 3ϕ x 16mm, TPAN |
| 342 | 22707185 | Screw, 4ϕ x 8mm, FTBID, BLK |

# 13. PARTS LIST

**CAUTION:**
The ⚠ mark, the symbol No. circled with rectangle in the schematic diagram and the shaded area in the parts list designate components which have special characteristics important for safety and should be replace only with types identical to those in the original circuit or specified in the parts list.

| Symbol No. | Part No. | Description |
|---|---|---|
| **TRANSISTORS, IC's & DIODES** | | |
| Q001 | | Transistor, 2SK61-GR |
| Q002, 003 | | Transistor, 2SC1923-O |
| Q101 | | Transistor, 2SC1923-O |
| Q102 | 22114626 | IC, HA11211 |
| Q103 | | Transistor, 2SC2878-B (R1L) |
| Q106, 107 | | Transistor, 2SC2878-B (R1L) |
| Q108 | | Transistor, 2SC941-TM, O |
| Q111, 112 | | Transistor, 2SC2878-B (R1L) |
| Q201 | | Transistor, 2SA1015-GR |
| Q202 | | IC, TA7343P |
| Q203, 204 | | Transistor, 2SC1815NEW-BL |
| Q205 | | Transistor, 2SC1815NEW-GR |
| Q301 | 22114470 | IC, NJM4558D-A |
| Q401, 402 | | Transistor, 2SC2878-B |
| Q501, 502<br>503, 504 | | Transistor, 2SA1015-GR |
| Q505, 506 | | Transistor, 2SC2705-Y |
| Q507, 508 | | Transistor, 2SA817A-Y |
| Q509, 510 | | Transistor, 2SC1627A-Y |
| Q511, 512 | | Transistor, 2SB595-O-Z |
| Q513, 514 | | Transistor, 2SD525-O-Z |
| Q701, 702 | | Transistor, 2SC1815NEW-GR |
| Q703 | | IC, TA7654P |
| Q704, 705<br>706, 707 | | Transistor, 2SC1815NEW-GR |
| Q708 | | Transistor, 2SA1015-GR |
| Q901 | | Transistor, 2SD880-Y |
| Q902 | | Transistor, 2SC1815NEW-GR |
| D001 | | Diode, 1S2236 |
| D101, 102 | | Diode, 1S1555V |
| D103 | 22115498 | Diode, 1K261UF |
| D104 | 22115498 | Diode, 1K261UF (R1L) |
| D106 | 22115498 | Diode, 1K261UF |
| D107 | | Diode, 1S1555V |
| D108 | 22115498 | Diode, 1K261UF |
| D201, 202 | | Diode, 1S1555V |

| Symbol No. | Part No. | Description |
|---|---|---|
| D501, 502 | | Diode, 1S1555V |
| D503, 504 | 22115481 | Diode, STV-3H |
| D701 | | Diode, TLR208 |
| D702, 704<br>706 | | Diode, TLG208 |
| D707 | | Diode, 1S1555V |
| D708 | | Diode, 02Z 7.5A |
| D709, 710 | | Diode, 1S1555V |
| ⚠ D901 | | Diode, 1S1942 |
| D902 | | Diode, 02Z 13A |
| D903 | | Diode, 05Z 18U |
| D904 | | Diode, 05Z15-U |
| ⚠ D905 | 22115438 | Diode, S2VB20 |
| **ELECTRICAL PARTS** | | |
| S401 ∼ 409 | 22195892 | Switch, Push (R1L) AUX/ PHONO/FM/MW/LW/TAPE MOD-MUTING/ LOUDNESS/MUTING |
| S401 ∼ 404 | 22195934 | Switch, Push (R1) AUX/ PHONO |
| S406 ∼ 409 | 22195934 | FM/AM/TAPE/MODE-MUTING /LOUDNESS/MUTING |
| ⚠ S901 | 22195631 | Switch, Push, Power (TE, TU, AY) |
| ⚠ S901 | 22195937 | Switch, Push Power (TA, TC) |
| J001 | 22162468 | Terminal, 4P, Antenna |
| J301, 302 | 22163831 | Jack, US4P |
| J501 | 22162486 | Terminal, 4P, Speaker |
| J502 | 22163870 | Jack, 6φ, Headphone |
| ⚠ J901 | 22167874 | AC Socket (TA, TC) |
| N501 | 22113550 | Lamp, RED, 12V, 40mA |
| N502 | 22113551 | Lamp, GRN, 12V, 40mA |
| Z101, 102<br>104 | 22153198 | Filter, Kit |
| Z103 | 22153118 | Filter, Ceramic, SFZ457A |
| Z201, 202 | 22153078 | Filter, MPX |
| F901, 902 | 22144330 | Fuse, 2.5A/250V |
| ⚠ F903 | 22144387 | Fuse, T800mA/250V (TE, TU, AY) |
| ⚠ F903 | 22144364 | Fuse, T2A/125V (TA, TC) |
| ⚠ EP01 | 22176286 | Power Cord, E2ES (TE) |
| ⚠ EP01 | 22176536 | Power Cord, BS (TU) |
| ⚠ EP01 | 22176588 | Power Cord, A2SA-7A (AY) |
| ⚠ EP01 | 22176573 | Power Cord EPUC-19 (TA, TC) |

## COILS & TRANSFORMERS

| Symbol No. | Part No. | Description |
|---|---|---|
| L001 | 22292078 | Coil, FM Antenna |
| L002 | 22294422 | Coil, FM RF |
| L003 | 22291082 | Coil, Choke, 2.2 μH |
| L004 | 22295116 | Coil, FM Oscillator |
| L102 | 22291082 | Coil, Choke, 2.2 μH |
| L103 | 22232250 | Coil, Trap, 114 KHz |
| L104 | 22291082 | Coil, Choke, 2.2 μH |
| L105 | 22242891 | Coil, AM Antenna (R1L) |
| L105 | 22242879 | Coil, AM Antenna (R1) |
| L110 | 22291082 | Coil, Choke, 2.2 μH (TA, TC) |
| L111 | 22291082 | Coil, Choke, 2.2 μH |
| L701 | 22230106 | Coil, Choke, 470 μH |
| T103 | 22245358 | Coil, AM Oscillator (R1) |
| T103 | 22245358 | Coil, MW Oscillator (R1L) |
| T104 | 22205055 | Coil, LW Oscillator (R1L) |
| T105 | 22264757 | IF Transformer, AM |
| T106 | 22264617 | IF Transformer, AM |
| ⚠ T901 | 22223898 | Transformer, Power (TE) |
| ⚠ T901 | 22223960 | Transformer, Power (TU, AY) |
| ⚠ T901 | 22224057 | Transformer, Power (TA) |
| ⚠ T901 | 22224058 | Transformer, Power (TC) |

## CAPACITORS

D = ±0.5pF, J = ±5%, K = ±10%, P = –0+100%, Z = –20+80%
ABBREVIATIONS: EL = Electrolytic, CD = Ceramic Disk,
MY = Mylar
PP = Polypropylene

| Symbol No. | Part No. | Description |
|---|---|---|
| C1, 2, 3, 4, 6, 8, 10 | 22308202 | Variable VC-5-335 |
| C5 | 22309180 | Trimmer, Max. 7pF |
| C7, 9, 11, 12 | 22309170 | Trimmer, Max. 20pF (R1L) |
| C7, 11 | 22309170 | Trimmer, Max. 20pF (R1) |
| C001 | 22361150 | CD, 15pF, 50V, J |
| C004 | 22361309 | CD, 3pF, 50V, D |
| C005 | 22342103 | CD, 0.01mfd, 50V, Z |
| C006 | 22361220 | CD, 22pF, 50V, J |
| C009 | 22361409 | CD, 4pF, 50V, D |
| C010 | 22361309 | CD, 3pF, 50V, D |
| C011 | 22362101 | CD, 100pF, 50V, K |
| C012 | 22342103 | CD, 0.01mfd, 50V, Z |
| C013 | 22342223 | CD, 0.022mfd, 50V, Z |
| C015 | 22360596 | CD, 24pF, 50V, J, PH |
| C018 | 22360593 | CD, 7pF, 50V, D, SH |
| C019 | 22360134 | CD, 22pF, 50V, J, CH |

| Symbol No. | Part No. | Description |
|---|---|---|
| C020 | 22360310 | CD, 10pF, 50V, D, CH |
| C021 | 22342103 | CD, 0.01mfd, 50V, Z |
| C101 | 22342103 | CD, 0.01mfd, 50V, Z |
| C102 | 22342223 | CD, 0.022mfd, 50V, Z |
| C103 | 22342223 | CD, 0.022mfd, 50V, Z |
| C104 | 22342223 | CD, 0.022mfd, 50V, Z |
| C105 | 22342103 | CD, 0.01mfd, 50V, Z |
| C106 | 22342473 | CD, 0.047mfd, 50V |
| C107 | 22488109 | EL, 1mfd, 50V |
| C108 | 22488339 | EL, 3.3mfd, 50V |
| C109 | 22488339 | EL, 3.3mfd, 50V |
| C110 | 22361270 | CD, 27pF, 50V, J |
| C111 | 22342223 | CD, 0.022mfd, 50V, Z |
| C112 | 22488338 | EL, 0.33mfd, 50V |
| C113 | 22342473 | CD, 0.047mfd, 50V, Z |
| C114 | 22342223 | CD, 0.022mfd, 50V, Z |
| C115 | 22342473 | CD, 0.047mfd, 50V, Z |
| C117 | 22362221 | CD, 220pF, 50V, K |
| C118 | 22361509 | CD, 5pF, 50V, D |
| C122 | 22371332 | MY, 0.0033mfd, 50V, J (R1L) |
| C125 | 22342103 | CD, 0.01mfd, 50V, Z |
| C128 | 22362680 | CD, 68pF, 50V, K |
| C131 | 22342103 | CD, 0.01mfd, 50V, Z |
| C133 | 22321049 | PP, 330pF, 50V, J |
| C134 | 22321084 | PP, 180pF, 50V, J (R1L) |
| C135 | 22485220 | EL, 22mfd, 16V |
| C136 | 22371183 | MY, 0.01mfd, 50V, J |
| C138 | 22342223 | CD, 0.022mfd, 50V, Z |
| C139 | 22485100 | EL, 10mfd, 16V |
| C140 | 22362470 | CD, 47pF, 50V, K |
| C141 | 22371103 | MY, 0.01mfd, 50V, J |
| C142 | 22371103 | MY, 0.01mfd, 50V, J |
| C143 | 22488108 | EL, 0.1mfd, 50V |
| C144 | 22483470 | EL, 47mfd, 10V |
| C145 | 22342223 | CD, 0.022mfd, 50V, Z |
| C148 | 22342223 | CD, 0.022mfd, 50V, Z |
| C149 | 22488109 | EL, 1mfd, 50V |
| C201 | 22485100 | EL, 10mfd, 16V |
| C202, 203 | 22488479 | EL, 4.7mfd, 50V |
| C204, 205 | 22488478 | EL, 0.47mfd, 50V |

| Symbol No. | Part No. | Description |
|---|---|---|
| C208 | 22488109 | EL, 1mfd, 50V |
| C209 | 22485221 | EL, 220mfd, 16V |
| C210 | 22488109 | EL, 1mfd, 50V |
| C211 | 22488339 | EL, 3.3mfd, 50V |
| C212 | 22321057 | PP, 1000pF, 50V, J |
| C301, 302 | 22488479 | EL, 4.7mfd, 50V |
| C303, 304 | 22485479 | EL, 4.7mfd, 16V |
| C305, 306 | 22371222 | MY, 2200pF, 50V, J |
| C307, 308 | 22371822 | MY, 8200pF, 50V, J |
| C309, 310 | 22488479 | EL, 4.7mfd, 50V |
| C311 | 22342223 | CD, 0.022mfd, 50V, Z |
| C312 | 22488109 | EL, 1mfd, 50V |
| C314, 315 | 22362151 | CD, 150pF, 50V, K |
| C316 | 22488478 | EL, 0.47mfd, 50V |
| C401, 402 | 22342473 | CD, 0.047mfd, 50V, Z |
| C403, 404 | 22362271 | CD, 270pF, 50V, K |
| C501, 502 | 22488228 | EL, 0.22mfd, 50V |
| C503, 504 | 22362560 | CD, 56pF, 50V, K |
| C505, 506 | 22362680 | CD, 68pF, 50V, K |
| C507, 508 | 22486220 | EL, 22mfd, 25V |
| C509, 510 | 22486221 | EL, 220mfd, 25V |
| C511, 512 | 22361150 | CD, 15pF, 50V, J |
| C513, 514 | 22485221 | EL, 220mfd, 16V |
| C515, 516 | 22362101 | CD, 100pF, 50V, K |
| C517, 518 | 22362101 | CD, 100pF, 50V, K |
| C519, 520 | 22371562 | MY, 0.0056mfd, 50V, J |
| C521, 522 | 22372122 | MY, 0.0012mfd, 50V, K |
| C523, 524 | 22372124 | MY, 0.12mfd, 50V, K |
| C525, 526 | 22372333 | MY, 0.033mfd, 50V, K |
| C527, 528 | 22361270 | CD, 27pF, 50V, J |
| C529, 530 | 22488109 | EL, 1mfd, 50V |
| C533 | 22488470 | EL, 47mfd, 50V |
| C701 | 22485221 | EL, 22mfd, 10V |
| C702 | 22488479 | EL, 4.7mfd, 50V |
| C703 | 22488109 | EL, 1mfd, 50V |
| C704 | 22485101 | EL, 100mfd, 16V |
| C705 | 22342223 | CD, 0.022mfd, 50V. Z |
| C706 | 22486330 | EL, 33mfd, 25V |
| C707 | 22342223 | CD, 0.022mfd, 50V, Z |
| C708 | 22488109 | EL, 1mfd, 50V |
| C709 | 22488109 | EL, 1mfd, 50V |
| ⚠ C901 | 22340140 | CD, 0.01mfd, 125V, P |
| ⚠ C901 | 22340150 | CD, 0.0047mfd, 400V, M |
| ⚠ C902, 903 | 22342473 | CD, 0.047mfd, 50V, Z |

| Symbol No. | Part No. | Description |
|---|---|---|
| ⚠ C904 | 22342223 | CD, 0.022mfd, 50V, Z |
| ⚠ C905 | 22486222 | EL, 2200mfd, 25V |
| ⚠ C907, 908 | 22440656 | EL, 4700mfd, 35V |
| C909 | 22486471 | EL, 470mfd, 25V |
| C910 | 22486221 | EL, 220mfd, 25V |
| C911, 912 | 22486221 | EL, 220mfd, 25V |
| C913 | 22487221 | EL, 220mfd, 35V |
| C914 | 22485221 | EL, 220mfd, 16V |
| C915 | 22487221 | EL, 220mfd, 35V |

## RESISTORS

All resistors are carbon film, ¼W, ±5% unless otherwise noted. K = 1,000 M = 1,000,000

| | | |
|---|---|---|
| R003 | 22545331 | 330 ohm |
| R004 | 22545472 | 4.7K ohm |
| R005 | 22545223 | 22K ohm |
| R006 | 22545222 | 2.2K ohm |
| R007 | 22545561 | 560 ohm |
| R010 | 22545682 | 6.8K ohm |
| R011 | 22545222 | 2.2K ohm |
| R012 | 22545272 | 2.7K ohm |
| R013 | 22555103 | 10K ohm |
| R014 | 22545101 | 100 ohm |
| R101 | 22545103 | 10K ohm |
| R102 | 22545273 | 27K ohm |
| R103 | 22545221 | 220 ohm |
| R104 | 22545331 | 330 ohm |
| R105 | 22545331 | 330 ohm |
| R107 | 22545154 | 150K ohm |
| R108 | 22545221 | 220 ohm |
| R109 | 22545683 | 68K ohm |
| R110 | 22555333 | 33K ohm |
| R111 | 22545100 | 10 ohm |
| R112 | 22545154 | 150K ohm |
| R115 | 22545104 | 100K ohm |
| R116 | 22545473 | 47K ohm |
| R117 | 22545473 | 47K ohm |
| R118 | 22545333 | 33K ohm |
| R119 | 22545103 | 10K ohm (R1L) |
| R120 | 22545682 | 6.8K ohm (R1L) |
| R121 | 22545103 | 10K ohm (R1L) |
| R122 | 22545103 | 10K ohm (R1L) |

| Symbol No. | Part No. | Description |
|---|---|---|
| R123 | 22545271 | 270 ohm |
| R124 | 22545222 | 2.2K ohm |
| R125 | 22545153 | 15K ohm |
| R126 | 22545221 | 220 ohm |
| R127 | 22545683 | 68K ohm |
| R128 | 22545103 | 10K ohm |
| R129 | 22545102 | 1K ohm |
| R130 | 22545821 | 820 ohm |
| R131 | 22658495 | 100K ohm Semi-fixed Variable |
| R132 | 22545103 | 10K ohm (R1L) |
| R133 | 22545103 | 10K ohm (R1L) |
| R134 | 22545472 | 4.7K ohm (TE, TU, AY) |
| R135 | 22545103 | 10K ohm |
| R136 | 22545151 | 150 ohm |
| R137 | 22545102 | 1K ohm |
| R139 | 22545222 | 2.2K ohm |
| R140 | 22545273 | 27K ohm |
| R141 | 22545103 | 10K ohm |
| R142 | 22545223 | 22K ohm |
| R143 | 22545222 | 2.2K ohm |
| R144 | 22545473 | 47K ohm |
| R145 | 22555561 | 560 ohm |
| R146 | 22555224 | 220K ohm |
| R147 | 22555104 | 100K (R1L) |
| R148 | 22555223 | 22K ohm |
| R201 | 22545223 | 22K ohm |
| R202 | 22545223 | 22K ohm |
| R204 | 22545102 | 1K ohm |
| R205 | 22545332 | 3.3K ohm |
| R206 | 22658257 | 10K ohm, Semi-Fixed Variable |
| R207 | 22545822 | 8.2K ohm |
| R208 | 22545332 | 3.3K ohm |
| R209 | 22545224 | 220K ohm |
| R210 | 22545152 | 1.5K ohm |
| R211 | 22545101 | 100 ohm |
| R213, 214 | 22545564 | 560K ohm |
| R215, 216 | 22545104 | 100K ohm |
| R217, 218 | 22545472 | 4.7K ohm |
| R219, 220 | 22545681 | 680 ohm |
| R221 | 22545123 | 12K ohm |
| R222 | 22545223 | 22K ohm |
| R223 | 22545473 | 47K ohm |
| R224, 225 | 22545153 | 15K ohm |

| Symbol No. | Part No. | Description |
|---|---|---|
| R226, 227 | 22545104 | 100K ohm |
| R301, 302 | 22545104 | 100K ohm |
| R303, 304 | 22545101 | 100 ohm |
| R305, 306 | 22545104 | 100K ohm |
| R307, 308 | 22545681 | 680 ohm |
| R309, 310 | 22545333 | 33K ohm |
| R311, 312 | 22545394 | 390K ohm |
| R313, 314 | 22545104 | 100K ohm |
| R401, 402 | 22545222 | 2.2K ohm |
| R405, 406 | 22545472 | 4.7K ohm |
| R407, 408 | 22657230 | 250K ohm, B, Variable Slide Volume |
| R409, 410 | 22545333 | 33K ohm |
| R411, 412 | 22545823 | 82K ohm |
| R501, 502 | 22545222 | 2.2K ohm |
| R503, 504 | 22545104 | 100K ohm |
| R505, 506 | 22545183 | 18K ohm |
| R507, 508 | 22545152 | 1.5K ohm |
| R509, 510 | 22545102 | 1K ohm |
| R511, 512 | 22545682 | 6.8K ohm |
| R513, 514 | 22545104 | 100K ohm |
| R515, 516 | 22545821 | 820 ohm |
| R517, 518 | 22545122 | 1.2K ohm |
| R519, 520 | 22658491 | 300 ohm, Semi-fixed Variable |
| R521, 522 | 22545101 | 100 ohm |
| R523, 524 | 22547331 | 330 ohm 1/2W |
| ⚠ R525, 526 | 22500122 | 100 ohm Fusible, (TA, TC) |
| ⚠ R527, 528 | 22500122 | 100 ohm Fusible, (TA, TC) |
| ⚠ R529, 530 | 22500260 | 0.22 ohm 3W, Wire Wound |
| ⚠ R531, 532 | 22500260 | 0.22 ohm 3W, Wire Wound |
| R533, 534 | 22545331 | 330 ohm |
| R535, 536 | 22545124 | 120K ohm |
| R538 | 22657225 | 100K ohm, C, Variable Slide, Bass |
| R539 | 22657225 | 100K ohm, C, Variable Slide, Treble |
| R541, 542 | 22545272 | 2.7K ohm |
| R543, 544 | 22545683 | 68K ohm |
| R545, 546 | 22545123 | 12K ohm |
| R547, 548 | 22545183 | 18K ohm |
| R549, 550 | 22545472 | 4.7K ohm |
| R551, 552 | 22545103 | 10K ohm |
| R553, 554 | 22570266 | 220 ohm, 1W, Metal Oxide Film |
| R553, 554 | 22545301 | 300 ohm |
| R555 | 22547221 | 220 ohm, 1/2W |

| Symbol No. | Part No. | Description |
|---|---|---|
| R706 | 22545103 | 10K ohm |
| R707 | 22545103 | 10K ohm |
| R708 | 22545473 | 47K ohm |
| R709 | 22545683 | 68K ohm |
| R710 | 22545102 | 1K ohm |
| R711 | 22545104 | 100K ohm |
| R712 | 22545102 | 1K ohm |
| R714 | 22545102 | 1K ohm |
| R715 | 22545473 | 47K ohm |
| R717 | 22545473 | 47K ohm |
| R718 | 22545682 | 6.8K ohm |
| R719 | 22547221 | 220 ohm, 1/2W |
| R720 | 22555104 | 100K ohm |
| R721 | 22555104 | 100K ohm |
| R722 | 22545103 | 10K ohm |
| R723 | 22555682 | 6.8K ohm |
| ⚠ R901 | 22500167 | 2.2 ohm, Fusible |
| R902 | 22545222 | 2.2K ohm |
| ⚠ R904 | 22500119 | 47 ohm, Fusible |
| R907 | 22545682 | 6.8K ohm |
| R908 | 22545122 | 1.2K ohm |
| R909 | 22547471 | 47 ohm 1/2W |
| ⚠ R910 | 22500177 | 33 ohm Fusible |
| ⚠ R911, 912 | 22563155 | 1.5M ohm, 1/2W, Composition (TA, TC) |
| | **ACCESSORIES** | |
| AC01 | 22124701 | Feeder Ass'y, Antenna |
| AC02 | 22903104 | Owner's Manual (TE) |
| AC02 | 22903147 | Owner's Manual (TU, AY) |
| AC02 | 22903205 | Owner's Manual (TA) |
| AC02 | 22903207 | Owner's Manual (TC) |

| Symbol No. | Part No. | Description |
|---|---|---|

**TOSHIBA CORPORATION**
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PRINTED IN JAPAN 22905055 Sep.,1981 Ⓢ